City of Charlotte
NPDES MS4 Permit Program

Stormwater
Management Program Plan

FY2020 Annual Report

CHARLOTTE SM

Permit Number NCS000240

October 2020

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Acronyms Used in This Document:

AAS:	Adopt-A-Stream
BMP:	Best Management Practice(s)
CAR:	Corrective Action Request(s)
CATS:	Charlotte Area Transit System
CDOT:	Charlotte Department of Transportation
CFD:	Charlotte Fire Department
CITY:	City of Charlotte
CMANN:	Continuous Monitoring Alert Notification Network
CMCSI:	Charlotte-Mecklenburg Certified Site Inspector
CMPD:	Charlotte-Mecklenburg Police Department
CMSWS:	Charlotte-Mecklenburg Storm Water Services
CW:	Charlotte Water Department (formerly Charlotte-Mecklenburg Utilities)
DO:	Dissolved Oxygen
DWF:	Dry Weather Flow
ETJ:	Extra Territorial Jurisdiction
FY:	Fiscal Year
GIS:	Geographic Information System

GSD-LD:	General Services Department-Land Development
GSD-SWS:	General Services Department-Storm Water Services Division
IDDE:	Illicit Discharge Detection and Elimination
IDEP:	Illicit Discharge Elimination Program
MEP:	Maximum Extent Practicable
MS4:	Municipal Separate Storm Sewer System
NCDEQ:	North Carolina Department of Environmental Quality
NOD:	Notice of Deficiency
NOV:	Notice of Violation
NPDES:	National Pollutant Discharge Elimination System
O&M:	Operation & Maintenance
PCSO:	Post-Construction Stormwater Ordinance (City)
QA/QC:	Quality Assurance/Quality Control Program
ROW :	Right-of-Way
RSPC :	Regional Stormwater Partnership of the Carolinas
SAP:	Standard Administrative Procedure
SARA:	Superfund Amendments and Reauthorization Act
SCM:	Stormwater Control Measure(s)
SDM :	Storm Drain Marking
SESCO:	Soil Erosion and Sedimentation Control Ordinance (City)
SOP:	Standard Operating Procedure(s)
SPRP:	Spill Prevention and Response Procedures(s)
SSO:	Sanitary Sewer Overflow(s)
SWAC:	Stormwater Advisory Committee
SWMP:	Stormwater Management Program Plan
SWPCO:	Stormwater Pollution Control Ordinance (City)
SWPPP:	Stormwater Pollution Prevention Plan
SWQ:	Surface Water Quality
TMDL:	Total Maximum Daily Load
TSS:	Total Suspended Solids
UNCC:	University of North Carolina at Charlotte
USEPA:	United States Environmental Protection Agency
WLA:	Waste Load Allocation
WQ:	Water Quality
WQS:	Water Quality Standards
WRRI-SWC:	Water Resources Research Institute – Stormwater Consortium
WTP:	Water Treatment Plant
WWTP:	Wastewater Treatment Plant

Section 1: Introduction

On November 1, 1993, the City of Charlotte ("City") began operating under National Pollutant Discharge Elimination System ("NPDES") Municipal Separate Storm Sewer System ("MS4") Permit Number NCS000240. This permit has subsequently been renewed for a 5-year permit term on four occasions and is currently in its 5th permit cycle effective October 10, 2018 through October 9, 2023.

This document provides the Annual Report for the Stormwater Management Program Plan ("SWMP") for fiscal year ("FY") 2020 under the current permit term as required by Part III, paragraph 2 and Part IV, paragraph B of the NPDES MS4 permit. The overall objective of this Annual Report is to document activities conducted in support of the SWMP during FY2020 (July 1, 2019 to June 30, 2020), assess program effectiveness, and discuss future proposed program activities and/or SWMP changes as necessary.

The City's General Services Department-Storm Water Services Division ("GSD-SWS") (formerly Engineering and Property Management Department-Storm Water Services Division (EPM-SWS)) is the primary agency responsible for managing the City's NPDES MS4 permit, the MS4 system and the SWMP. The implementation of the requirements within the permit program and SWMP are coordinated with other applicable City departments as necessary. In addition, coordination is conducted with the NPDES MS4 permit programs for the jurisdictions in Mecklenburg County adjacent to the City where appropriate and feasible. This coordination is conducted to help ensure uniformity between the local NPDES MS4 stormwater permit programs and jurisdictions. Mecklenburg County stormwater staff along with GSD-SWS staff collectively form Charlotte-Mecklenburg Storm Water Services ("CMSWS"). City and County surface water quality staff within CMSWS work together to accomplish many of the activities discussed in this report.

Included in this SWMP Annual Report are:

- Best management practice(s) ("BMPs") that are being used to fulfill the program requirements;
- Frequency and status of each BMP;
- Measurable program goals and planned future activities;
- Implementation schedule;
- Responsible positions; and
- An assessment of program activities conducted during the reporting year.

Staff of GSD-SWS, under the direction of the City's Surface Water Quality and Environmental Permitting Program Manager, is responsible for the fulfillment of most of the activities discussed in this SWMP. Exceptions to this include the City's General Services Department-Land Development Division ("GSD-LD"), which was the primary group during FY2020 responsible for the Development and Redevelopment Plan Review and Construction Site Stormwater Runoff Control programs within the SWMP. In addition, the City's Department of Transportation-Street

Maintenance Division and Solid Waste Services Department have responsibility for routine maintenance of certain portions of the MS4, in coordination with GSD-SWS. Funding for the BMPs specified in the SWMP is provided by local stormwater utility fees, except where noted. The City's SWMP includes the following core permit programs:

1. Public Education and Outreach Program – This program provides the public and businesses with information on surface water quality, pollution prevention, and reporting problems, as well as specialized information on various activities that have the potential to cause pollution and harm surface water quality. This information is delivered through a wide range of methods including print, web, radio, social media, television, presentations, and public events.

2. Public Involvement and Participation Program – This program provides the public and businesses the opportunity to participate in various programs within the City's SWMP. Charlotte-Mecklenburg government maintains a Storm Water Advisory Committee ("SWAC"), which is an appointed citizen panel to review and comment on the City's and County's stormwater programs. In addition, public volunteer opportunities are available with City/County programs such as Storm Drain Marking, Adopt-a-Stream, and the annual Big Spring Clean event.

3. Illicit Discharge Detection and Elimination Program – This program is designed to protect surface water quality by detecting and eliminating pollution sources such as improper sewage or wastewater connections; illegal discharges of chemicals, paint, or oil; and accidental discharges from sanitary sewer lines and vehicle accidents. As part of this program, the City enforces the "City of Charlotte - Stormwater Pollution Control Ordinance," which prohibits the discharge of pollutants to the storm drainage system and receiving streams. The City relies on reports from the public, various monitoring programs, and a wide range of other activities to assist in identifying and eliminating these sources of pollution.

4. Construction Site Stormwater Runoff Control Program – This program maintains the City's delegated erosion and sediment control program to control sediments and other pollutants from construction sites. As part of this program, the City enforces the "City of Charlotte - Soil Erosion and Sedimentation Control Ordinance," which requires suitable erosion control on project sites. The City conducts routine inspections of construction sites and issues violation notices and fines when necessary to ensure compliance with the ordinance.

5. Post-Construction Stormwater Management Program – This program is designed to control the discharge of pollutants in stormwater runoff from new development and redevelopment projects. As part of this program, the City enforces the "City of Charlotte – Post-Construction Stormwater Ordinance," which requires structural stormwater controls for applicable new development and redevelopment projects as defined in the ordinance. The program involves review and approval of project plans as well as site inspections and maintenance activities to ensure that treatment practices are properly operated and maintained.

6. Pollution Prevention/Good Housekeeping Program – This program focuses on ensuring that City facilities and field operations are managed in a way that minimizes stormwater pollutant discharges. Stormwater Pollution Prevention Plans and Spill Response Plans are maintained for applicable facilities that conduct activities with the potential for stormwater pollutant discharges. The City conducts inspections and training sessions at these facilities to ensure that requirements are being met. Field operations are evaluated for impacts on stormwater quality and best management practices are developed and implemented in order to minimize those impacts.

7. Program to Monitor and Control Pollutants in Stormwater Discharges to Municipal Systems This program focuses on industrial facilities that discharge stormwater to the City's MS4 and receiving streams. Inspections are conducted at these facilities on a rotational basis to review site operations and materials handling practices. In addition, if the facility has a stormwater permit, it is reviewed to ensure that permit conditions are adhered to.

8. Water Quality Assessment and Monitoring Program – This program maintains a surface water quality monitoring plan designed to monitor major streams to determine surface water quality conditions and assist in evaluating the effectiveness of various stormwater management programs. The program is also used to assist in locating illicit discharges and connections where possible.

9. Total Maximum Daily Load ("TMDL") Program – This program maintains a TMDL watershed plan designed to address applicable TMDL pollutants of concern by implementing best management practices (BMPs) within the six minimum NPDES stormwater permit measures. These BMPs are designed to reduce the TMDL pollutant of concern within the Permittee's assigned MS4 NPDES regulated waste load allocation to the maximum extent practicable ("MEP"), and to the extent authorized by law.

Note: Due to the Coronavirus COVID-19 pandemic of 2020 and resulting restrictions placed by the State of North Carolina and Mecklenburg County, many of the programs discussed in this report have experienced reduced ability to be implemented fully and, therefore, data results reported for FY2020 may be lower, on average, than those reported in previous annual report years.

Section 2: Background Information

2.1 Population Served

The SWMP covers the jurisdictional area, including the incorporated and extra territorial jurisdiction ("ETJ") areas, for the City, as applicable and as defined by the NPDES MS4 permit. **Table 2-1** provides the population for the City based on the 2000 and 2010 US census. This census data is obtained from the following website of the US Census Bureau:

https://www.census.gov/quickfacts/table/PST045216/3712000,00

Table 2-1: Population and Growth Rate for the City of Charlotte.

2019 Population (estimated)	2010 Population	2000 Population	Average Annual Percent Change (2010-2019)
885,708	731,424	540,828	2.34%

2.2 Growth Rate

Table 2-1 shows the population growth rate represented as an "Average Annual Percent Change" for the City. This growth rate is calculated by dividing the overall percent change between the 2010 and 2019 population by the 9-year interval.

2.3 Jurisdictional and MS4 Service Areas

The jurisdictional and MS4 service area for the City is provided in **Table 2-2**. The location of this area within Mecklenburg County and corresponding watershed areas are provided in **Figure 2-1**. The source of this information is the City Planning Department, which updates jurisdictional and geographical boundaries as annexations occur.

Table 2-2: Jurisdictional and MS4 Service Area for the City of Charlotte.

Incorporated Area (Sq. Miles)	ETJ (Sq. Miles)	Total Jurisdiction (Sq. Miles)
309	67	376

2.4 MS4 Conveyance System

The existing MS4 serving the City is composed of curbs, gutters, catch basins, culverts, pipes, ditches, and outfalls that collect and convey stormwater for discharge to receiving streams. Currently, there are an estimated 6,997 outfalls, 3,702 miles of storm drain pipe and 163,751 catch basins and drop inlets within the City's MS4. Pipe systems are typically 15 inches or larger in diameter and are designed for the ten-year storm event. Outlet energy is commonly dissipated through the use of end-walls or flared end sections with riprap aprons. Although the natural alignment of many receiving streams has been altered over the past century, many of the stream banks remain mostly vegetated as a result of the City's stormwater management philosophies. Stream banks that were previously armored with riprap are currently allowed to re-vegetate naturally, and new projects incorporate "soft" methods involving tree plantings and other vegetation.

Maintenance and improvements to the MS4 system are funded by stormwater utility fees collected within the City. Maintenance activities include cleaning inlets of debris and sediment, maintaining channels to reduce erosion and maximize pollution reduction capabilities, and the removal of blockages. Improvements to the MS4 system include solving infrastructure problems, channel stabilization, safety improvements, stream habitat enhancement, surface water quality enhancement, and resolving flooding problems associated with stormwater generated from public streets.

2.5 Land Use Composition Estimates

The number of square miles and percentage of the MS4 service area under residential, commercial, industrial and open space land use categories are provided in **Table 2-3**. These percentages include the incorporated area and ETJ for the City. **Figure 2-2** provides a map of these land use areas. Land use estimates are derived from Mecklenburg County land parcel geographic information system ("GIS") data (2019).

Table 2-3: Percentage of Land Uses in the City of Charlotte (including ETJ).

Land use Category	Number of Square Miles	% of Land Use within City of Charlotte and ETJ
Residential	132	35
Commercial	56	15
Industrial	13	4
Open Space	98	26
Institutional	20	5
Transportation/Other	54	14
Lake Water/Open Space	3	1

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FIGURE 2-1
Charlotte Jurisdictional Area and Watersheds

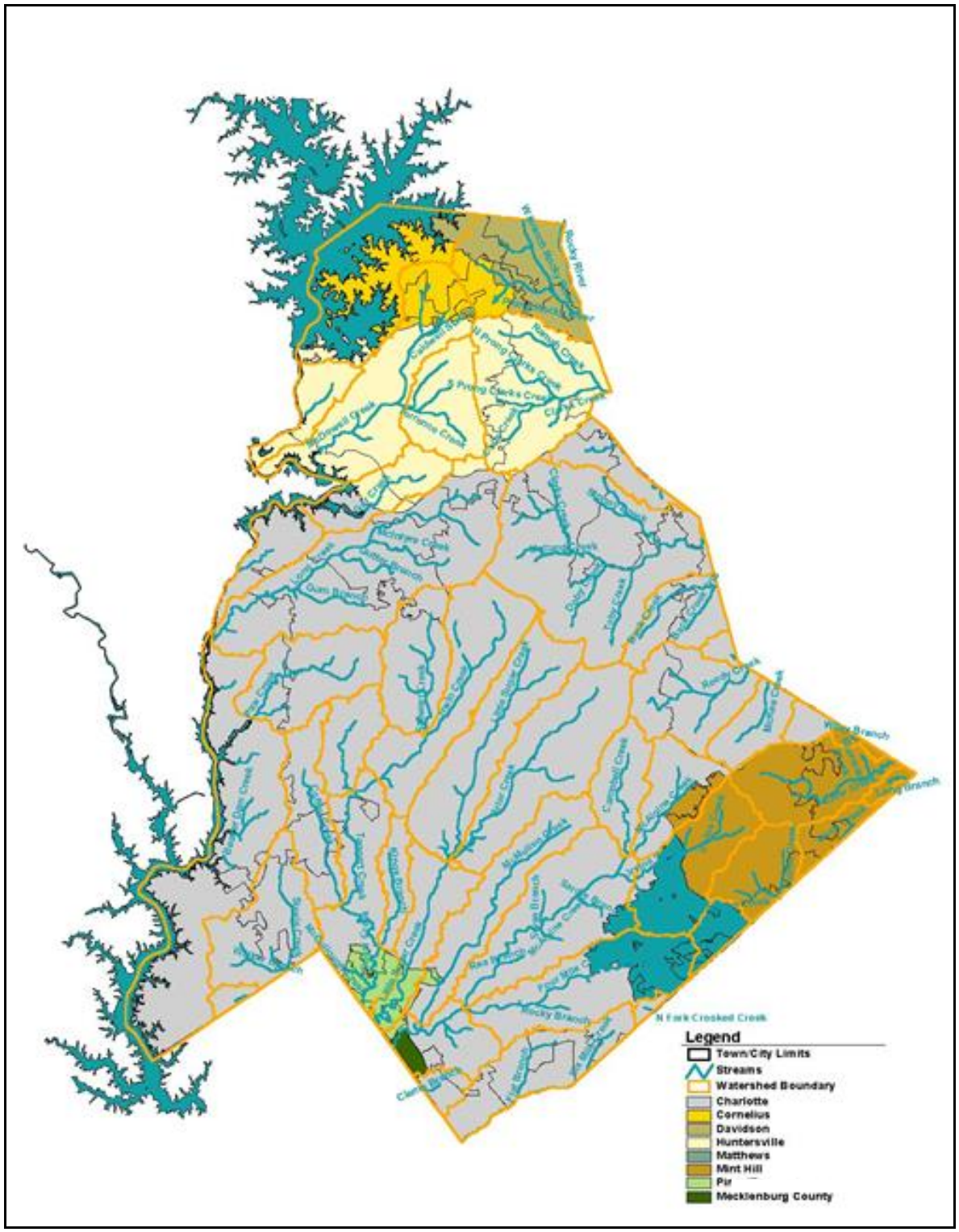
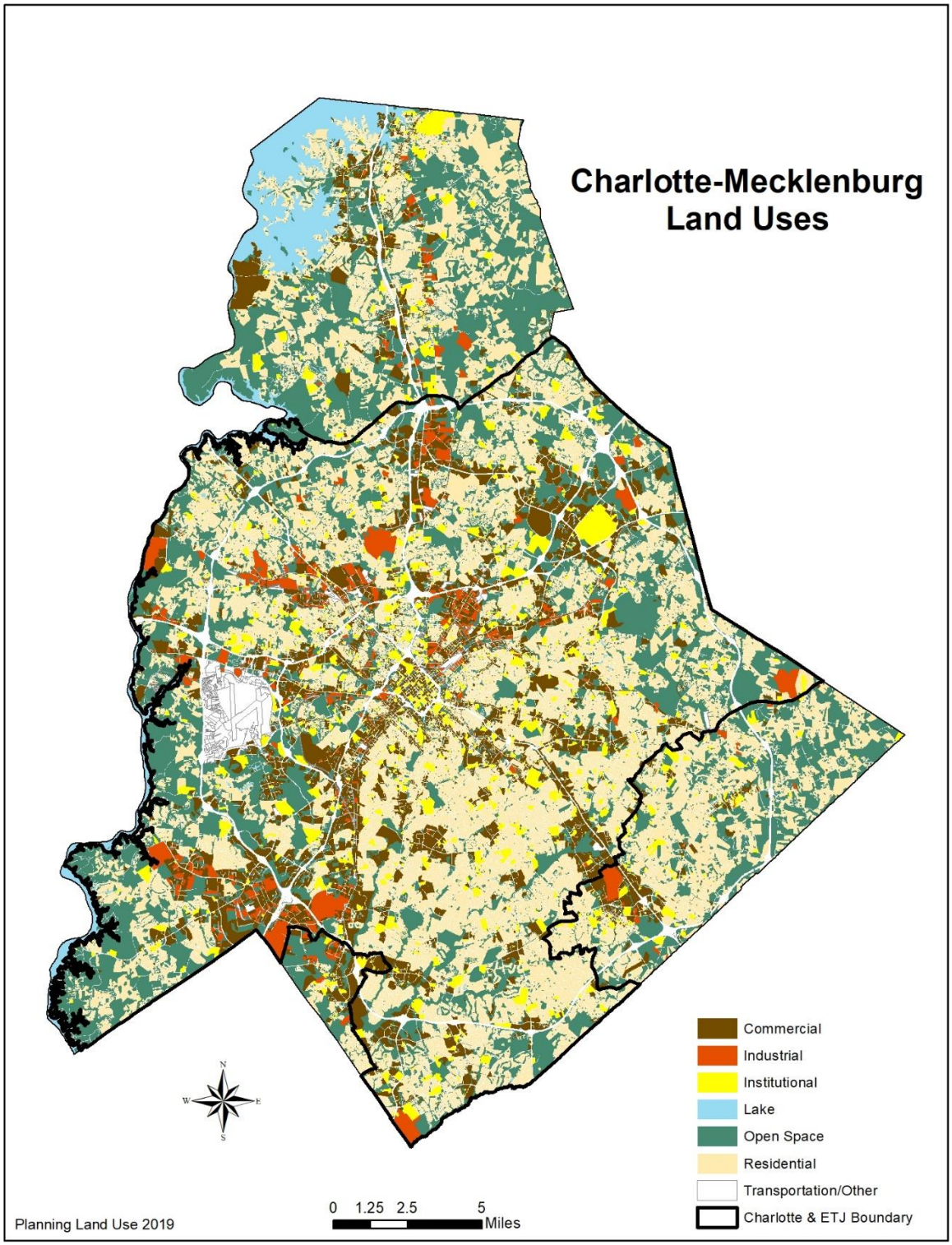


FIGURE 2-2


Charlotte-Mecklenburg
Land Uses
Commercial
Industrial
Institutional
Lake
Open Space
Residential
Transportation/Other
Charlotte & ETJ Boundary
0 1.25 2.5 5
Miles
Planning Land Use 2019

2.6 Receiving Waters

Approximately two-thirds of the City of Charlotte land area drains west in the Catawba River Basin while the remaining one-third drains east in the Yadkin-Pee Dee River Basin. MS4 receiving stream information by river basin is provided in **Table 2-4** (Catawba) and **Table 2-5** (Yadkin-Pee Dee). The information for the development of these tables is obtained from the 2018 Category 5 303(d) list. The location of the watershed areas in the City of Charlotte is illustrated in **Figure 2-1**.

Table 2-4: Catawba River Basin Streams

Receiving Stream Name	Stream Segment Index #	WQ Classification	Use Support Rating	WQ Issues (303(d) Listing)
Catawba River (Mountain Island Lake below elevation 648)	11-(114)	WS-IV, B, CA	Impaired	PCB Fish Tissue Advisory[5]
Catawba River (Lake Wylie below elevation 570)	11-(117)	WS-IV-CA	Impaired	PCB Fish Tissue Advisory[5]
Catawba River (Lake Wylie below elevation 570)	11-(122)	WS-IV, B, CA	Impaired	PCB Fish Tissue Advisory[5]
Catawba River (Lake Wylie below elevation 570)	11-(123.5)	WS-IV, B	Impaired	PCB Fish Tissue Advisory[5]
Long Creek	11-120-(0.5)	C	Not Rated	None
Long Creek	11-120-(2.5)	WS-IV	Not Rated	None
Dixon Branch	11-120-1	C	Not Rated	None
McIntyre Creek	11-120-3-(1)	C	Not Rated	None
McIntyre Creek	11-120-3-(2)	WS-IV	Not Rated	None
Gutter Branch	11-120-4-(1)	C	Not Rated	None
Gutter Branch	11-120-4-(2)	WS-IV	Not Rated	None
Gum Branch	11-120-5	WS-IV	Not Rated	None
Paw Creek	11-124	C	Not Rated	None
Ticer Branch	11-124-1	C	Not Rated	None
Little Paw Creek	11-125	C	Not Rated	None
Beaverdam Creek	11-126	C	Not Rated	None
Stowe Branch	11-127	C	Not Rated	None
Porter Branch	11-133	C	Not Rated	None
Studman Branch	11-134	C	Not Rated	None
Sugar Creek	Portions of 11-137a,b,c	C	Impaired	Fecal Coliform [4t]; Turbidity [1t]; Benthos Impairment[5]
Irwin Creek	11-137-1	C	Impaired	Dissolved Oxygen [1t]; Fecal Coliform [4t]; Turbidity [4t]; Fish impairment
Stewart Creek	11-137-1-2	C	Not Rated	None
Taggart Creek	11-137-2	C	Not Rated	None
Coffey Creek	11-137-4	C	Not Rated	None
Kings Branch	11-137-6	C	Not Rated	None
McCullough Branch	11-137-7	C	Impaired	Benthos impairment

Receiving Stream Name	Stream Segment Index #	WQ Classification	Use Support Rating	WQ Issues (303(d) Listing)
Little Sugar Creek	11-137-8	C	Impaired	Copper(5) Mercury(5) Turbidity(1t) Dissolved Oxygen(1t); Fecal Coliform (4t); Benthos impairment(4s)
Dairy Branch	11-137-8-1	C	Not Rated	None
Briar Creek	11-137-8-2	C	Not Rated	None
Edwards Branch	11-137-8-2-1	C	Not Rated	None
Little Hope Creek	11-137-8-3	C	Not Rated	None
McAlpine Creek	11-137-9	C	Impaired	Dissolved Oxygen(1t); Fecal Coliform (4t);Turbidity (1t); Benthos and fish impairment(5)
Campbell Creek	11-137-9-1	C	Not Rated	None
Irvins Creek	11-137-9-2	C	Not Rated	None
Fourmile Creek	11-137-9-4	C	Not Rated	None
Rocky Branch	11-137-9-4-1	C	Not Rated	None
McMullen Creek	11-137-9-5	C	Impaired	Benthos impairment(5)
Steele Creek	11-137-10	C	Not Rated	None**
Walker Branch	11-137-10-1	C	Not Rated	None
Polk Ditch	11-137-10-1-1	C	Not Rated	None
Clems Branch	11-137-11	C	Not Rated	None
Sixmile Creek	11-138-3	C	Impaired	Fish impairment(5)
Twelvemile Creek	11-138	C	Impaired	Dissolved Oxygen(5); Copper(5); Turbidity(5); Fish impairment(4s)
Flat Branch	11-138-3-2	C	Not Rated	None

Table 2-5: Yadkin-Pee Dee River Basin Streams

Receiving Stream Name	Stream Segment Index #	WQ Classification	Use Support Rating	WQ Issues (303(d) Listing)
Mallard Creek	13-17-5b	C	Impaired	Turbidity(5)
Clarks Creek	13-17-5-2	C	Impaired	Benthos impairment(5)
Doby Creek	13-17-5-3	C	Impaired	Benthos impairment(5)
Toby Creek	13-17-5-4	C	Impaired	Benthos impairment(5)
Stony Creek	13-17-5-5	C	Impaired	Benthos impairment(5)
Back Creek	13-17-7	C	Impaired	Benthos impairment(5)
Fuda Creek	13-17-7-1	C	Not Rated	None
Reedy Creek	13-17-8	C	Impaired	Benthos impairment(5)*
McKee Creek	13-17-8-4	C	Impaired	Fecal Coliform(4t); Benthos impairment(5)

Use Support Ratings

(1t) No criteria exceeded but approved TMDL for parameter of interest

(4s) Impaired biological integrity with an identified Aquatic Life Standards Violation listed in Category 5

(4t) Designated use impaired with an approved TMDL

(5) Designated use impaired because of biological or ambient surface water quality standards violations and needing a TMDL

** Listed as impaired on South Carolina 303(d) list for Fecal Coliform; TMDL developed May 2007.

Source: North Carolina's 2018 303(d) Report

Section 3: Public Education and Outreach Program

During the annual report period, the Public Education and Outreach Program distributed educational materials to the community and conducted outreach activities focused on the impacts of stormwater discharges on water bodies per the SWMP. The following sub-sections explain:

- The BMPs implemented to meet program requirements;
- Target audience and pollution sources;
- Outreach strategy;
- Measures of success;
- Future goals and planned activities; and
- Program assessment.

3.1 BMP Summary Table

Table 3-1 provides information concerning the BMPs implemented to fulfill the Public Education and Outreach Program requirements.

Table 3-1: BMP Summary Table for the Public Education and Outreach Program.

BMP	BMP Description	Schedule (years)					Responsible Position
		1	2	3	4	5	
Describe target pollutants and target pollutant sources	Describe the target pollutants and target pollutant sources the permittee's public education program is designed to address and why they are an issue.	X	X	X	X	X	Water Quality Program Manager
Describe target audiences	Describe the target audiences likely to have significant stormwater impacts and why they were selected.	X	X	X	X	X	Water Quality Program Manager
Informational Web Site	The permittee shall promote and maintain an internet web site designed to convey the program's message.	X	X	X	X	X	Water Quality Program Manager
Distribute public education materials to identified user groups.	Distribute general stormwater educational material to appropriate target groups as likely to have a significant stormwater impact.	X	X	X	X	X	Water Quality Program Manager
Promote and maintain Hotline/Help line	Promote and maintain a stormwater hotline(s) or helpline(s) for the public to request information about stormwater, public involvement & participation, and to report illicit connections & discharges, etc.	X	X	X	X	X	Water Quality Program Manager
Implement a Public Education and Outreach Program.	The permittee's outreach program, including those elements implemented locally or through a cooperative agreement, shall include a combination of approaches designed to reach the target audiences. For each media, event, or activity the permittee shall estimate and record the extent of exposure.	X	X	X	X	X	Water Quality Program Manager

3.2 Target Pollutants and Sources

Table 3-2 provides the specific pollution sources targeted for the public education program as well as a description as to why the sources are important for protecting surface water quality in the City.

Table 3-2: Targeted Pollution Sources for the Public Education and Outreach Program.

Target Pollutant	Pollution Source	Issue
Bacteria	Improper Waste Disposal Sanitary Sewer Overflows Pet Waste	Many surface waters in Charlotte are impaired due to high fecal coliform levels. Improper handling and disposal of wastes can result in the discharge of a variety of pollutants to the storm drainage system, causing increases in harmful bacteria. Discharges of food wastes such as fats, oils, and greases to the sanitary sewer system can result in line blockages that cause sanitary sewer overflows. Improper disposal of pet waste can also cause discharges of bacteria to the storm drainage system.
Sediment	Construction Erosion Stream Bank Erosion	Many surface waters in Charlotte are impaired due to turbidity related to sediment discharges. Improper erosion control practices at construction sites can result in sediment discharges to the storm drainage system. In addition, uncontrolled volumes of stormwater runoff can cause scouring of stream banks resulting in increased sediment volumes in streams.

3.3 Target Audience

The City's public education and outreach program reaches a fairly broad representation of the city's population through various methods as explained in Section 3.4 with the goal of reaching certain target audiences for particular reasons as explained below. The target audiences are evaluated with each annual SWMP update and as part of the development of the SWMP following permit renewal.

Multi-Family Residential Apartment Complexes: This target audience is selected because private sanitary sewer systems at apartment complexes are often not well-maintained and have been found to be significant contributors to sanitary sewer overflow(s) ("SSOs") in the municipal sewer system due to improper disposal of grease and other items by apartment residents. Outreach efforts to multi-family communities are described further in Section 5 of this report.

Construction Industry: This target audience is selected because it has the greatest potential for affecting erosion and sedimentation control at construction sites, which can be a significant contributor of sediment to the City's waterways. Outreach efforts to the construction industry are described further in Section 6 of this report.

Commercial Sectors: Various commercial sectors are targeted for education each year due to the significant negative impacts they can have on surface water quality by improperly handling and disposing of wastes and practicing poor housekeeping at their facilities. Each year an evaluation of previous pollution service requests, illicit discharges, and notices of violation is conducted to

determine which commercial sectors are commonly demonstrating non-compliance. Based on that evaluation, education and outreach efforts are focused on particular sectors for a certain time period, typically a fiscal year. Outreach efforts to commercial sectors are described in this section and Section 5 of this report.

School-aged Children: Children are very important when it comes to protecting surface waters. They play in creeks and lakes and, therefore, want to protect them. They bring home what they learn and encourage their parents to adopt positive behaviors for protecting surface water quality. Lessons about surface water quality and stormwater pollution often fit into and enhance science learning principles required by school curricula. Also, teaching children instills a sense of responsibility for the environment that can carry forward and grow into their adult lives. For these reasons, the City's public education program focuses significant resources on teaching students at various grade levels.

Pet Owners: Pet waste is identified as a significant source of bacteria in surface waters, so starting during FY2018, CMSWS added pet owners as a target audience as one way to help combat elevated fecal coliform counts in local creeks.

Diverse and under-represented audiences: CMSWS has also been exploring and implementing ways to educate an even more diverse representation of our population. Research and strategizing have been done to establish priorities and determine effective methods for sharing water quality messages with various audiences and getting more of them involved in volunteering and advocating for protection of water resources. Staff have begun to implement new methods and programs for reaching out to new audiences.

3.4 Stormwater Public Education and Outreach Program

The City's Stormwater Public Education and Outreach Program provides surface water quality and pollution prevention messages to educate residents and businesses about the ways they can help protect surface water quality and get involved to help reduce stormwater pollution. The program provides these messages in the following ways:

- Mass Media;
- Social Media;
- Public Hotline Promotion;
- School Presentations;
- Public Presentations and Events;
- Website;
- Public Education Materials; and
- Special Campaigns and Programs.

3.4.1 Mass Media

Significant resources are spent on providing surface water quality messages through mass media channels because they are one of the most effective ways to reach adult audiences. The media campaign focuses on four main themes:

- Report Pollution;
- Volunteer;
- Flood Safety; and
- Aging Infrastructure.

Media channels utilized to promote events and messages consist of television, radio, and website advertisements. During previous years, print advertisements were also used; however, public opinion survey results have shown that these advertisements are seen less frequently and are less effective. Television advertisements are run on local stations WBTV, WCNC and WCCB and radio advertisements ran on WFAE 90.7 FM and 102.1 Latina Radio. The Latina Radio station is a newer station that CMSWS began advertising on to diversify and reach different groups. CMSWS also works with WCCB to produce "Wilson's World" segments that focus on the importance of recognizing and reporting stormwater pollution. WCNC produces "Walk and Talk" segments that are filmed at various sites and focus on sources of pollution and volunteering. These segments are considered "added value" segments as they provide additional media impressions at no additional cost.

Print media for the City's program includes the use of:

- Environmental notices/brochures; and
- Utility bill inserts

Table 3-3 shows the data relative to these media channels for the report period.

Table 3-3: Mass Media, Social Media, and Website Program Results

Activity	Results
Television advertising spots run	583
Radio advertising spots run	148
Television advertising media impressions	2,168,675
Radio advertising media impressions	874,272
Website advertisements run	140,745
Website advertising media impressions	3,927,637
Print advertisements run	0
Print advertising media impressions	0
Environmental notices/brochures issued	2
Utility bill inserts (stormwater related) mailed	1,530,000
Facebook fans	7,342
Instagram followers	766
Twitter followers	1,171
YouTube page subscribers	61
Social media posts made	648
Social media responses made	1,240

Activity	Results
Water Watchers mobile app downloads	40
Water Watchers mobile app SWQ problem reports received	10
Illicit discharges detected through Water Watchers program[1.]	5
Public requests to hotline received (stormwater related)	9,104
Public requests to hotline (SWQ related)	605
Website page views	381,610
Website unique page views	152,566

1. This data included in the total Illicit Discharges data shown in Table 5-14.

3.4.2 Social Media

CMSWS continues efforts to build a social media presence as more and more people are receiving information through this media source. Four social media channels used by CMSWS are shown in **Table 3-4.**

Table 3-4: Social Media Channels

Social Media Account	Name	Handle	URL
Facebook	CMSWS	@StormWaterCM	https://www.facebook.com/StormWaterCM
Twitter	CMSWS	@StormWaterCM	https://twitter.com/StormWaterCM
Instagram	CMSWS	@StormWaterCM	https://www.instagram.com/stormwatercm/
YouTube	CMSWS	N/A	https://www.youtube.com/user/StormWaterServices

CMSWS posts various videos and news stories on its YouTube channel. CMSWS also provides more content, pictures and videos related to stormwater pollution, surface water quality, pollution prevention and flood messages on Facebook, Twitter and Instagram and boosts some posts to reach tens of thousands of users, all aimed at reflecting the diversity of the community. **Figure 3-1** shows a typical Facebook post and **Table 3-3** shows the data relative to social media channels for the report period.

Figure 3-1: Typical Facebook post

During FY2013, CMSWS launched a mobile application called "Water Watchers" for citizens to report pollution. Due to fewer application downloads over time and application performance issues, the City and County agreed to discontinue the use of the Water Watchers application and transitioned to the CLT+ application for pollution reporting. The CLT+ application allows residents to submit requests related to various municipal services. The application can be downloaded by the public and used to make reports of pollution. Promotion of the CLT+ app will occur going forward. **Table 3-3** shows the data relative to the Water Watchers application for the report period.

3.4.3 Public Reporting Mechanisms

Figure 3-2: City Bus Wrap

The City, in cooperation with Mecklenburg County, operates a joint customer service hotline to receive information about a variety of concerns. Citizens can call 311 to report pollution, flooding, and blockages to the drainage system as well as request other City/County services. The 311-call center is staffed to receive calls Monday through Friday from 7 am to 7 pm. Citizens can also submit requests for service to 311 at any time by using the CLT+ app or by going online to the "Report a Problem" section of the website. All personnel from the customer service group receive training on stormwater issues and pollution to ensure calls are directed to appropriate personnel and handled in a timely manner. The training manual for 311 staff is reviewed and updated periodically to ensure information and resources are accurate.

A variety of tools and events are used to promote the 311-reporting hotline including:

- Giving away promotional products such as magnets and water bottles with CMSWS logo and 311 information;
- Providing information about reporting pollution on a website;
- Working with local TV stations to produce news segments focused on reporting pollution;
- Buying media time and airing a TV advertisements focused on reporting pollution;
- Designing and mailing the utility bill inserts focused on various program topics and activities; and
- Implementing vehicle wraps (**Figures 3-2 and 3-8**).

The 311-call center refers calls for stormwater general, structural, and flooding concerns to GSD-SWS while surface water quality concerns are referred to CMSWS. **Table 3-3 and Table 3-5** provide information about the number and type of callers that reported stormwater and surface water quality issues.

Table 3-5: Surface Water Quality Service Request Source Summary

Caller Type	Service Requests
Public Citizen	358
Business	5
Charlotte Fire Department staff	42
Charlotte-Mecklenburg Police Department staff	2
Charlotte Storm Water Services staff	61
Charlotte Water staff	37
Mecklenburg County Storm Water Services staff	65
State – NCDEQ staff	4
Environmental Protection Agency/NRC	2

Caller Type	Service Requests
Other	29
TOTAL	**605**

3.4.4 School Presentations

During the report period, a new macroinvertebrate identification lesson was developed and used in classes. This was created to allow education staff to be able to teach about macroinvertebrates and bio-indicators without the need for live bugs to be brought into the classroom.

Figure 3-3: Online Floodplain Model Demonstration

Due to the 2020 COVID-19 pandemic, many school presentations were moved to a digital format and staff created Facebook LIVE events. This allowed CMSWS to continue to get out messages, even to those children that were not in schools due to the stay at home order. The different programs available include:

- Blue Planet (also offered virtually);
- Common Water;
- Freddie the Fish (also offered virtually);
- Enviroscape Model and Video Demonstration;
- Flood Plain Model Demonstration
- Continuous Monitoring Alert Notification Network ("CMANN") Demo and Power Point;
- Festival Table Demonstrations; and
- Career Day.

Two stormwater pollution videos (made by a former local meteorologist) and the Enviroscape model are also available on loan to schools upon their request. **Figure 3-3** shows an online floodplain model demonstration while **Table 3-6** shows the data relative to the school presentations for the report period.

3.4.5 Public Presentations and Workshops

A variety of surface water quality presentations and workshops are available from CMSWS to the public, interest groups, businesses and industrial facilities upon request. Each presentation, while similar in nature, is also changed depending on the topic of interest and the audience receiving the presentation. For example, presentations on topics such as yard waste, food grease, pollution prevention, surface water quality information, and landscaping tips are typically available. **Table 3-6** shows the data relative to the public presentations for the report period.

3.4.6 Public Events

CMSWS staff participates in a variety of community events that are used to promote education campaigns, give away promotional products, provide face-to-face education opportunities, and provide formal presentations on surface water quality topics when appropriate. **Table 3-6** shows the data relative to public event participation for the report period.

Table 3-6: Presentation and Event Program Results

Activity	Results
School presentations conducted	26
Students educated at school presentations	1,416
Public presentations conducted	29
Citizens educated at public presentations	672
Public events participated in	8
Citizens interacted with at public events	1,860

3.4.7 Informational Website

A significant amount of resources are utilized to promote and maintain the CMSWS website http://charlottenc.gov/StormWater (**Figure 3-4**) which continues to be one of the best ways to provide the public with surface water quality information. A vast amount of information is provided on this website including, but not limited to, pollution prevention fact sheets, activities and lessons for kids, volunteer activities, sediment and erosion, regulations, data, maps, watershed information, and stormwater projects. **Table 3-3** shows the number of website page views and the number of unique page views (i.e. the number of times a page is accessed at least once during a browsing session).

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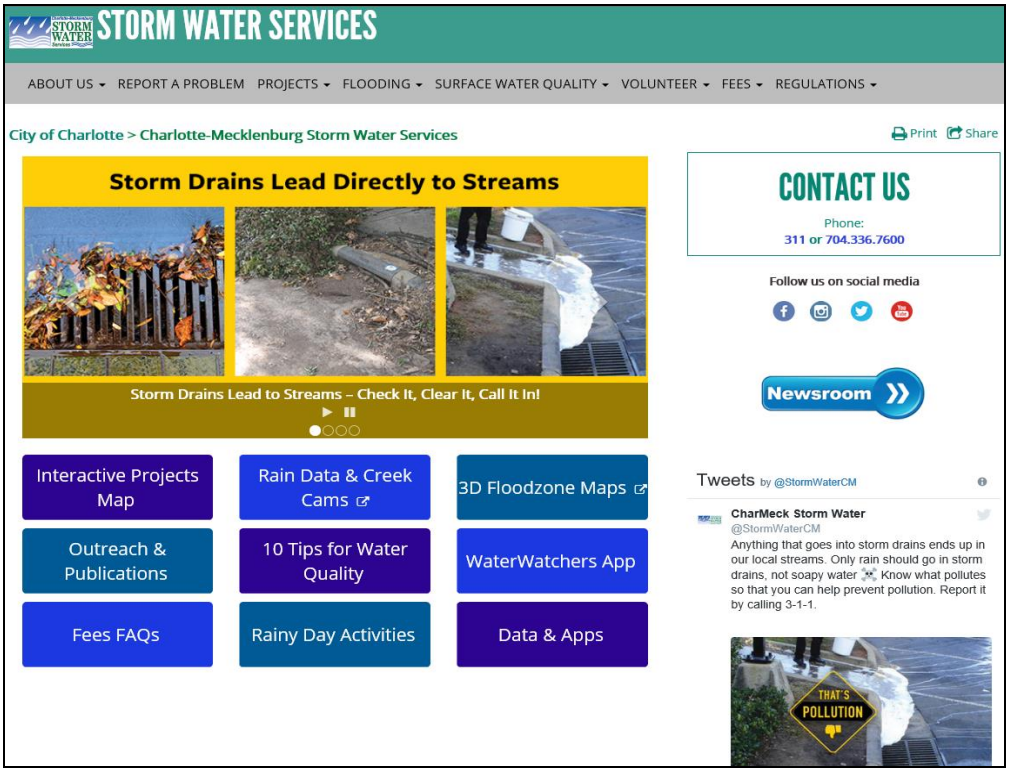

Figure 3-4: CMSWS Main Webpage

Figure 3-5: Example Brochure

3.4.8 Public Education Materials

This outreach mechanism is used to target specific pollution sources associated with the public and industrial/commercial facilities including lawn care practices, handling of used oil and other automotive wastes, housekeeping techniques, etc. Public outreach materials are also used to increase public reporting of pollution problems. **Figure 3-5** shows an example of a brochure that is distributed during responses to citizen service requests. The following provides a list of topics for the written outreach materials/handouts available to staff for distribution during citizen requests for service:

- BMPs for Managers of Apartments and Condos
- BMPs for Coal-Tar-Based Sealants (English, Spanish)
- BMPS for Vehicle and Equipment Repair
- BMPs for Indoor Cleaning Industry (English, Spanish)
- BMPS for Commercial Property Management Industry
- BMPS for Concrete Industry

- BMPS for Landscape Maintenance Industry
- BMPS for Municipal Contractors
- BMPS for Painting Industry
- BMPS for Swimming Pools and Spas (2019)(English, Spanish)
- BMPS for Pressure Washers, Vehicle Detailers, and Other Surface Cleaning Operations
- BMPs for the Food Service Industry (2019) (English, Spanish, Chinese)
- BMPs for Clean Boating
- Outdoor Washing Activities: Commercially-Available Containment, Collection and Filtering products for Stormwater Compliance
- Acceptable Practices for Disposal of Wash Water from Pressure Washing, Vehicle Detailing and Other Surface Cleaning Operations
- BMPs for Rooftop Work
- BMPs for the Stone Cutting Industry
- Pollution Prevention a Guide to Yard Waste and Lawn Care
- Automotive BMP Poster
- BMPs for Breweries
- BMPs for Pavement Sealing (English, Spanish)
- A Guide to Used Oil Recycling
- Scoop the Poop (proper handling of animal waste)
- Only Rain Goes Down The Storm Drain – The Citizen's Guide to Pollution Prevention
- Volunteer Opportunities Brochure
- Flow Free (proper disposal of grease from Charlotte Water Department)
- Dry Detention BMP Maintenance
- Rain Garden BMP Maintenance
- Sand Filter BMP Maintenance
- SW Wetland BMP Maintenance
- Wet Pond BMP Maintenance
- Environmental Notices – Disposal into the storm drain is against the law (available in English, Spanish, Chinese, Vietnamese, and Korean)

A number of these brochures are available in Spanish and CMSWS offers translation services in other languages as well. **Table 3-3** shows the number of environmental notices/brochures distributed for the report period.

3.4.8.1 Promotional Items

Promotional items are designed and distributed to complement outreach activities such as group presentations, workshops and public events. All promotional items have the CMSWS website and include other messages as space allows. **Table 3-7** shows the promotional items distributed.

Table 3-7: Promotional Items

Promotional Item	Message
Ink Pens	Six rotating messages – report pollution, street to stream, volunteer, turn around don't drown, flooding can happen anywhere, buy flood insurance
Umbrella Rain Gauge	General stormwater information; Stormwater.CharMeck.org
Flashlight	General stormwater information; Stormwater.CharMeck.org
Sunscreen	General stormwater information; Stormwater.CharMeck.org
Stormy's Guide to Stormwater Coloring Book	General stormwater information

3.4.8.2 Utility Bill Inserts

CMSWS includes utility bill inserts in various monthly water/sewer utility bills issued by Charlotte Water (CW) department. The inserts focus on various topics which include typically volunteering, surface water quality, flooding, CMSWS services and fee changes. **Table 3-3** shows the total number of stormwater related utility bill inserts that were mailed during the report period, and **Figure 3-6** shows a typical utility bill insert that is mailed.

Figure 3-6: October 2019 Utility Bill Insert

3.4.9 Regional Stormwater Partnership

The City is an active member of the Regional Stormwater Partnership of the Carolinas ("RSPC"); a partnership which includes 20 municipalities throughout the region that collaborate on meeting NPDES MS4 permit requirements, particularly education and outreach initiatives. Formed in 2006 and originally comprised of professionals from six municipalities in the Charlotte metropolitan area, the RSPC was developed as a forum for stormwater professionals to work collaboratively on local stormwater issues. The RSPC has grown significantly and has

obtained a registered 501(c)(3) organization designation. The RSPC provides an opportunity to leverage limited resources to fulfill common needs of the partners.

During FY2020, the RSPC began employing an NC AmeriCorps Member to help with initiatives. One initiative included the development and creation of a database of Title 1 schools along with contact information for educators who may find stormwater/water resources from the RSPC valuable within their teaching curriculum. Educational modules and videos were also created as a resource in order to meet new demands for virtual learning due to the 2020 COVID-19 pandemic. Educators within the member municipalities were contacted by e-mail about the resources available through the RSPC**.**

The RSPC's media campaign ran television, radio and web-based television advertisements on WCCB CW, GCCB MeTV, HCCB Antenna TV and WCCB charlotte.com. **Table 3-8** shows the data relative to these advertisements for the report period. WCCB ran a Carolina Insight story highlighting stormwater infrastructure and two Rising Spotlight segments that discussed the benefits of stormwater fees to homeowners and ways citizens can help keep waterways clean.

In addition to these media endeavors, there was an "Elected Officials Stormwater Workshop" held for officials from the member municipalities. This workshop discussed stormwater basics, permit requirements, fees, infrastructure and control measures. The RSPC also held a municipal staff training entitled, *"Spill Response, Illicit Discharges, and Good Housekeeping,"* during the fall season. An announcement invitation and agenda were created and circulated through the RSPC municipalities for the training. Finally, members as well as the public can visit the RSPC website. **Table 3-8** also shows the data relative to these activities for the report period.

Table 3-8: Regional Stormwater Partnership Program Results*

Activity	Results*
Television advertising spots run (regular)	475
Television advertising spots run (web based)	151
Radio advertising spots run	84
Television advertising media impressions (regular)	8,966,574
Television advertising media impressions (web based)	469,430
Radio advertising media impressions	444
Educational workshops conducted	2
Attendees at workshops conducted	117
Educators contacted about RSPC available resources	290
RSPC website visits	2,284
RSPC website new users	2,271

* This data not included in summary data shown in Table 3-11

3.4.10 Special Campaigns and Programs

Pet Waste Campaign: CMSWS conducts a "Scoop the Poop" campaign that targets pet owners as a way to educate them about surface water quality impacts from pet waste and the importance of cleaning it up. This program includes many components such as the

Figure 3-7: Pet waste flag

temporary flagging of deposits of dog waste (**Figure 3-7**) in various parks and greenway locations along with signs that provide information about harmful impacts to surface water quality and human health. The campaign also includes social media posts on Facebook, Instagram, and Twitter, and also receives local media coverage which helps to raise awareness. **Table 3-9** shows the data relative to this program for the report period.

Vehicle Wraps: A new truck wrap joined the growing fleet of wrapped CMSWS vehicles. The vehicle wraps are a unique outreach tool for publicizing stormwater issues. The truck wrap makes a connection between clean water and healthy aquatic life while the three other vehicles address the street to stream connection, smelly streams, and mud pollution (**Figure 3-8**). In addition to informing and educating, these wraps encourage residents to recognize and report pollution by calling 311.

Figure 3-8: Vehicle Wrap on a CMSWS vehicle

Figure 3-9: Stormy mascot

Stormy Mascot: During FY2018, CMSWS worked with a vendor to create a "Stormy the Turtle" mascot which is based on previous use of the Stormy character in various education and outreach materials. Stormy has quickly become popular and appears at various events including parades, photo shoots, and festivals. CMSWS continues to utilize Stormy in this way to enhance the education and outreach program and plans to expand use of the character as part of the Storm Water Services brand. **Figure 3-9** shows Stormy riding in a city parade and **Table 3-9** shows the data relative to this program for the report period.

Creek Week: CMSWS participates in a nationwide program called Creek Week in order to bring more attention to the importance of creeks in the community. CMSWS partners with several other governmental and non-profit organizations to develop and market events that tie into the overall surface water quality theme. A logo is used, and events are held including several story times at libraries, a volunteer monitoring workshop, a stream restoration educational walk, and various

stream cleanups and educational workshops. **Table 3-9** shows the data relative to this program for the report period.

Table 3-9: Special Campaign and Activity Program Results

Activity	Results
Pet Waste locations targeted	2
Pet Waste deposits marked	40
Pet Waste messages issued	16
Pet Waste receptacles provided	100
Pet Waste Facebook posts	6
Pet Waste Instagram posts	2
Pet Waste Twitter posts	4
Pet Waste Facebook shares	138
Pet Waste Instagram reactions	272
Pet Waste Twitter re-tweets	40
Pet Waste educational table events	0
Stormy Mascot appearances at events	10
Creek Week events held	0

Improving Diversity in Outreach Programs: CMSWS also participates with other education and outreach efforts such as the NCWRRI-SWC grant with Johnson C. Smith University and Rising Solutions. The primary focus of the grant is education and community outreach related to stormwater issues in historically underserved neighborhoods. Specifically, CMSWS is working with three neighborhoods in Charlotte's historic West End. The grant includes leveraging and expanding existing volunteer programs and understanding citizen priorities related to stormwater. Project results and outcomes will be shared with other municipalities to apply learned principles in their areas.

During FY2020, a report was also created which summarizes resources and opportunities for improved education and outreach to the Latin community in Charlotte and Mecklenburg County. Staff will draw on this report in future years to help expand outreach and education to our Latin citizens.

Furthermore, a database of Title 1 schools and contact information was created with the aim of connecting additional teachers with stormwater resources and information.

3.5 Measurable Goals/Planned Activities for Future Program Years

Table 3-10 describes the various Public Education and Outreach BMPs and the Measurable Goals and Planned Activities for Future Program Years for each BMP by permit term year.

Table 3-10: BMP Measurable Goals for the Public Education and Outreach Program.

BMP	BMP Description	Measurable Goals (by permit term year)				
		1	2	3	4	5+
Describe target pollutants and target pollutant sources	Describe the target pollutants and target pollutant sources the permittee's public education program is designed to address and why they are an issue.	Identify target pollution sources utilizing monitoring and service request data	Review and update target pollution sources as necessary. (On-going, years 2 – 5+)			
Describe target audiences	Describe the target audiences likely to have significant stormwater impacts and why they were selected.	Identify target audiences to adopt desired surface water quality improvement behaviors	Review and update target audiences as necessary. (On-going, years 2 – 5+)			
Informational Web Site	The permittee shall promote and maintain an internet web site designed to convey the program's message.	Continue to maintain an informational website to provide program information to the public. (On-going, years 1 – 5+)				
Distribute public education materials to identified user groups.	Distribute general stormwater educational material to appropriate target groups as likely to have a significant stormwater impact. Instead of developing its own materials, the permittee may rely on state-supplied Public Education and Outreach materials, as available, when implementing its own program.	Distribute educational materials at public events, workshops and presentations. (On-going, years 1 – 5+)				
Promote and maintain Hotline/Help line	Promote and maintain a stormwater hotline/helpline.	Maintain a hotline that receives information from the public 24 hours a day. (On-going, years 1 – 5+)				
Implement a Public Education and Outreach Program.	The permittee's outreach program, including those elements implemented locally or through a cooperative agreement, shall include a combination of approaches designed to reach the target audiences. For each media, event or activity, including those elements implemented locally or through a cooperative agreement the permittee shall estimate and record the extent of exposure.	Continue to implement a plan to conduct education & outreach activities, including a media campaign, that address target pollutants and audiences. (On-going, years 1 – 5+)				

3.6 Program Assessment

The overall Public Education and Outreach Program was successfully implemented during the annual report period. **Table 3-11** shows a summary of the various items and corresponding data results for activities conducted under the program.

Table 3-11: Program Summary

PUBLIC EDUCATION PROGRAM	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024
Advertising spots	924	731				
Advertising media impressions	6,063,651	6,970,584				
Utility bill inserts (stormwater related)	1,330,520	1,530,000				
Social Media Followers/Subscribers	8,927	9,340				
Social media posts	620	648				
Social media responses	1,045	1,240				
Public requests to hotline (stormwater related)	8,934	9,104				
Public requests to hotline (SWQ related)	553	605				
Presentations	135	55				
Persons educated at presentations	3,492	2,088				
Public events	33	8				
Citizens interacted with at public events	3,970	1,860				
Website page views	376,617	381,610				

Overall: A combination of evaluation tools indicates that the City's residents were successfully being exposed to surface water quality education messages. It is always difficult to measure the true impact of an education program, but continued program offerings and continued participation in them indicate that messages were successfully provided through a diverse set of communication channels. To be successful, CMSWS must build on its strengths and invest in new learning opportunities that attract and motivate current, new and expanding audiences to actively engage in activities that reduce the impacts of stormwater discharges to our surface waters. Staff has developed plans and done research on potential methods that can be used to reach more diverse audiences and expand the outreach program. The following provides more detail regarding some of the information and numbers reported above.

Target Pollutants and Audiences: The target pollutants in our education and outreach program are bacteria and sediment because these two pollutants are the primary pollutants causing impairment in local surface waters. As such, several of our target audiences for education and outreach are aimed at reducing the target pollutants. Our program focusing on reducing sanitary sewer overflows from multi-family residential communities continued in FY2020 as discussed in Section 5. Staff continued to adapt the program in order to improve its effectiveness. Since pet waste contributes to fecal coliform levels in surface waters, CMSWS implemented a pet waste education campaign, also discussed in Section 5. The program appears to be successful at changing behavior as shown by an increasing percent of people responding in our annual survey

that they routinely pick up their pet's waste. During FY2020, staff continued to expand our education to various commercial sectors, driven by observations and data from our IDDE program. It is felt that this is an important and effective aspect of our education and outreach program, and we will continue to implement it as we have in past years. One of our longest-running and most successful education and outreach programs targeted at sediment reduction is the CMCSI program for the construction industry. Section 6 provides details on the program this past year. The program is very successful in educating construction professionals about sedimentation and erosion control; therefore, CMSWS plans to continue the program. Finally, targeting school children and expanding the diversity of citizens we reach are important parts of our program. It is vitally important to educate young people about stormwater pollution and environmental issues in general, and as the diversity of our population increases, we must strive to learn about and deliver unique ways of educating people

Mass Media: During FY2020, CMSWS utilized traditional media such as television and radio as well as website advertisements and social media. In FY2020 the only print media utilized was the creation of utility bill inserts as effectiveness and reach of other traditional print advertisements has declined.

Utility Bill Inserts: During FY2020, six utility bill inserts were created which was one more than the year before. This increase in distribution frequency increased the reach of our inserts.

Public Events & Public Presentations: The number of public events and citizen interactions decreased while the number of public presentations remained consistent. This is due to cancellations following the 2020 COVID-19 pandemic. Public presentation numbers remained steady due to the ability to host virtual learning sessions.

School Presentations: The number of school presentations and students educated dropped significantly. This is due to schools abruptly entering virtual learning during the 2020 COVID-19 pandemic.

Website Page views: The number of website page views increased slightly this fiscal year.

Social Media: CMSWS gained over 744 additional followers/subscribers to its social media channels during the report period. Facebook fans showed a 5% increase, Instagram followers a 28% increase, and Twitter followers a 11% increase from last year.

Public Requests: Calls from citizens as a group made up 59% of all calls, which was 49% higher than from the next most frequent caller type, Mecklenburg County Storm Water Services staff, which accounted for 10% of calls. This is important information for targeting education campaigns related to pollution reporting.

Public Opinion Survey Results: A Public Opinion Survey was conducted during Spring 2019 and surveyed 401 respondents in order to measure how successful outreach campaigns are at reaching the general public. During FY2020, 80% of respondents understood that storm drains lead directly to streams, this is a 11% increase from previous years. The survey also showed that

over 40% of respondents were able to recall seeing or hearing something in the past 12 months about CMSWS, and the most frequent place was on a utility bill insert.

Section 4: Public Involvement and Participation Program

During the annual report period, the Public Involvement and Participation Program provided opportunities for the public to participate in program development and implementation per the SWMP. The following sub-sections explain:

- The BMPs implemented to meet program requirements;
- Target audience;
- Volunteer opportunities;
- Public involvement mechanisms;
- Measures of success;
- Future goals and planned activities; and
- Program assessment.

4.1 BMP Summary Table

Table 4-1 provides information concerning the BMPs implemented to fulfill the Public Involvement and Participation Program requirements.

Table 4-1: BMP Summary Table for the Public Involvement and Participation Program.

BMP	BMP Description	Schedule (years)					Responsible Position
		1	2	3	4	5	
Volunteer community involvement program	The permittee shall include and promote volunteer opportunities designed to promote ongoing citizen participation.	X	X	X	X	X	Water Quality Program Manager
Establish a Mechanism for Public involvement	The permittee shall provide and promote a mechanism for public involvement that provides for input on stormwater issues and the stormwater program.	X	X	X	X	X	Stormwater Division Manager
Establish Hotline/Help line	The permittee shall promote and maintain a hotline/helpline for the purpose of public involvement and participation.	X	X	X	X	X	Water Quality Program Manager
Public Review and Comment	The permittee shall make copies of their most recent Stormwater Plans available for public review and comment.	X	X	X	X	X	Water Quality Program Manager
Public Notice	Pursuant to 122.34 the permittee must, at a minimum, comply with State, Tribal and local public notice requirements when implementing a public involvement/ participation program.	X	X	X	X	X	Water Quality Program Manager

4.2 Volunteer Involvement Program

4.2.1 Target Audience

Public involvement is essential for ensuring the success of volunteer programs. The City recognizes that without public involvement and support, little progress can be made toward protecting and improving surface water quality in streams. The primary target audience for volunteer participation includes citizens between the ages of 25 and 55 due to their likelihood to become involved in volunteer activities. There is a special emphasis to improve outreach to the African-American and Hispanic populations and to increase the diversity of engaged citizens in general. The following sub-sections discuss the volunteer programs used in the City's overall Public Involvement and Participation Program.

Figure 4-1: Storm Drain Marker

4.2.2 Storm Drain Marking Program

CMSWS continues to provide volunteers the opportunity to help educate their community about stormwater pollution through the Storm Drain Marking (SDM) program. This program enables volunteers to adhere vinyl printed markers (**Figure 4-1**) to storm drains along streets they select in their neighborhoods. CMSWS provides the decals, adhesive, safety vests and information forms for completion by the groups. Following the completion of storm drain marking activities, the groups submit a report that includes the street names and number of drains marked, information concerning the condition of storm drains, and whether any pollution problems were observed. CMSWS staff records the storm drains that are marked and ensures any issues reported receive follow-up investigation.

The SDM program is well-organized and relatively easy-to-manage activity for successfully including citizens of all ages in stormwater education. By using a more focused approach and targeting families and volunteer groups, the program usually sees an increase in participation. In addition, SDM activities are tracked in order to help determine programmatic gaps and where resources should be focused. **Figure 4-2** shows the locations where SDM activities were conducted and **Table 4-2** shows the data relative to this program for the report period.

4.2.3 Adopt-A-Stream Program

The objective of this program is for volunteers to "adopt" segments of streams and agree to walk them, picking up trash and reporting any pollution problems found along the way. The program not only serves as a public involvement initiative, but it also allows for interaction and observations of the City's streams by its citizens, which can lead to the identification and elimination of pollution sources.

The Adopt-A-Stream (AAS) program is designed in a way that empowers volunteers and provides them with the necessary resources and educational information to assist in improving surface water quality conditions in Charlotte-Mecklenburg streams. Individuals, families, organized groups, schools, businesses, and industry adopt their favorite stream sections and are

responsible for walking these sections a minimum of two times per year. The current AAS Program format promotes a sense of community ownership and responsibility for local water resources.

AAS activities are tracked in order to help determine programmatic gaps and where resources should be focused. **Figure 4-3** shows the locations where AAS activities were conducted and **Table 4-2** shows the data relative to this program for the report period.

Table 4-2: SDM, AAS, and Big Spring Clean Program Results

Activity	Results
Storm drains marked	758
Storm Drain Marking volunteers	103
Storm Drain Marking volunteer hours	215
Adopt-A-Stream groups	121
Adopt-A-Stream clean-ups	153
Adopt-A-Stream volunteers	1,976
Adopt-A-Stream volunteer hours	5,133
Adopt-A-Stream miles cleaned	114
Adopt-A-Stream trash collected (tons)	26
Big Spring Clean volunteers	0
Big Spring Clean volunteer hours	0
Big Spring Clean stream miles cleaned	0
Big Spring Clean trash collected (tons)	0
Illicit discharges detected through this program[1.]	3

1. This data included in the total Illicit Discharges data shown in Table 5-14.

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FIGURE 4-2

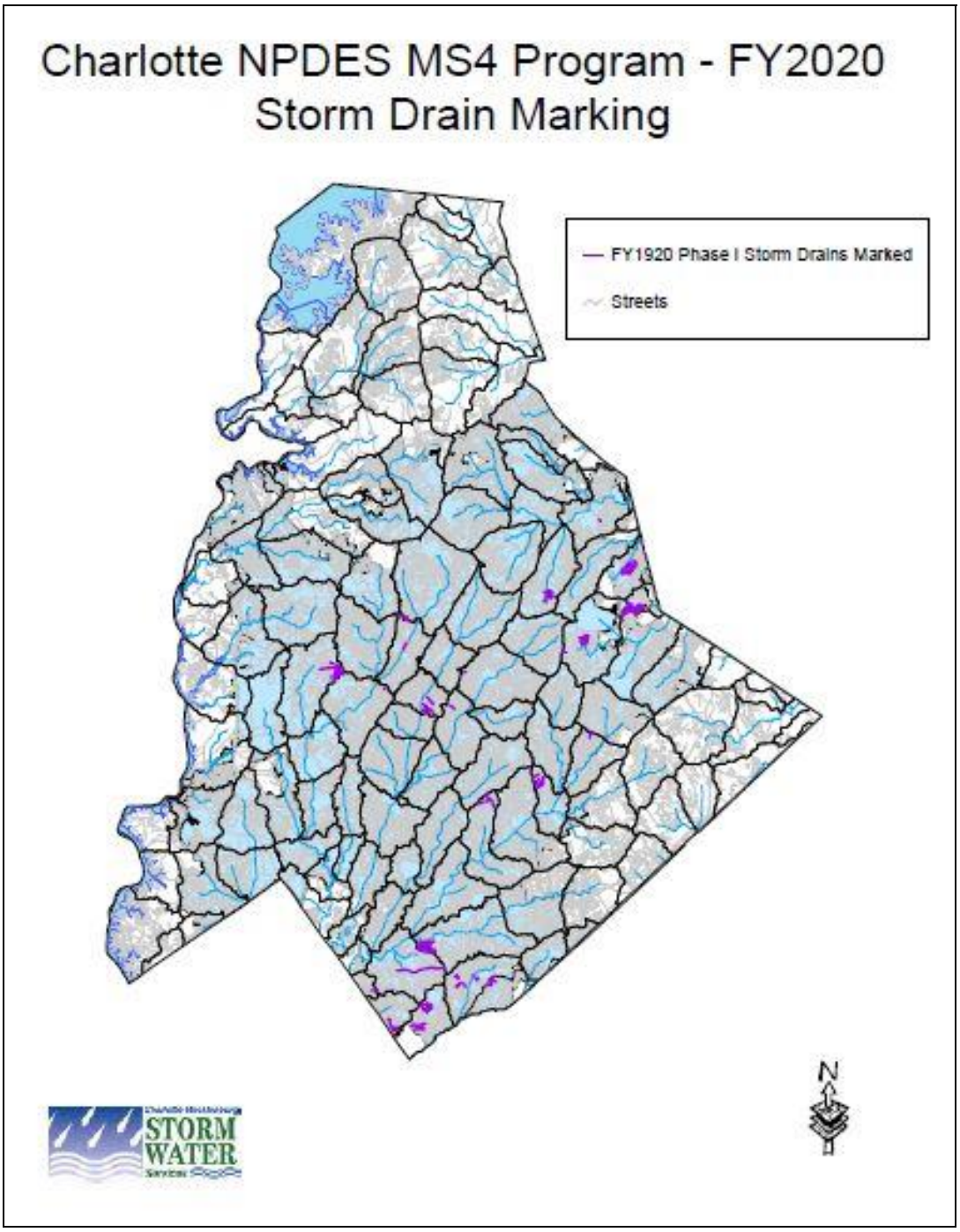
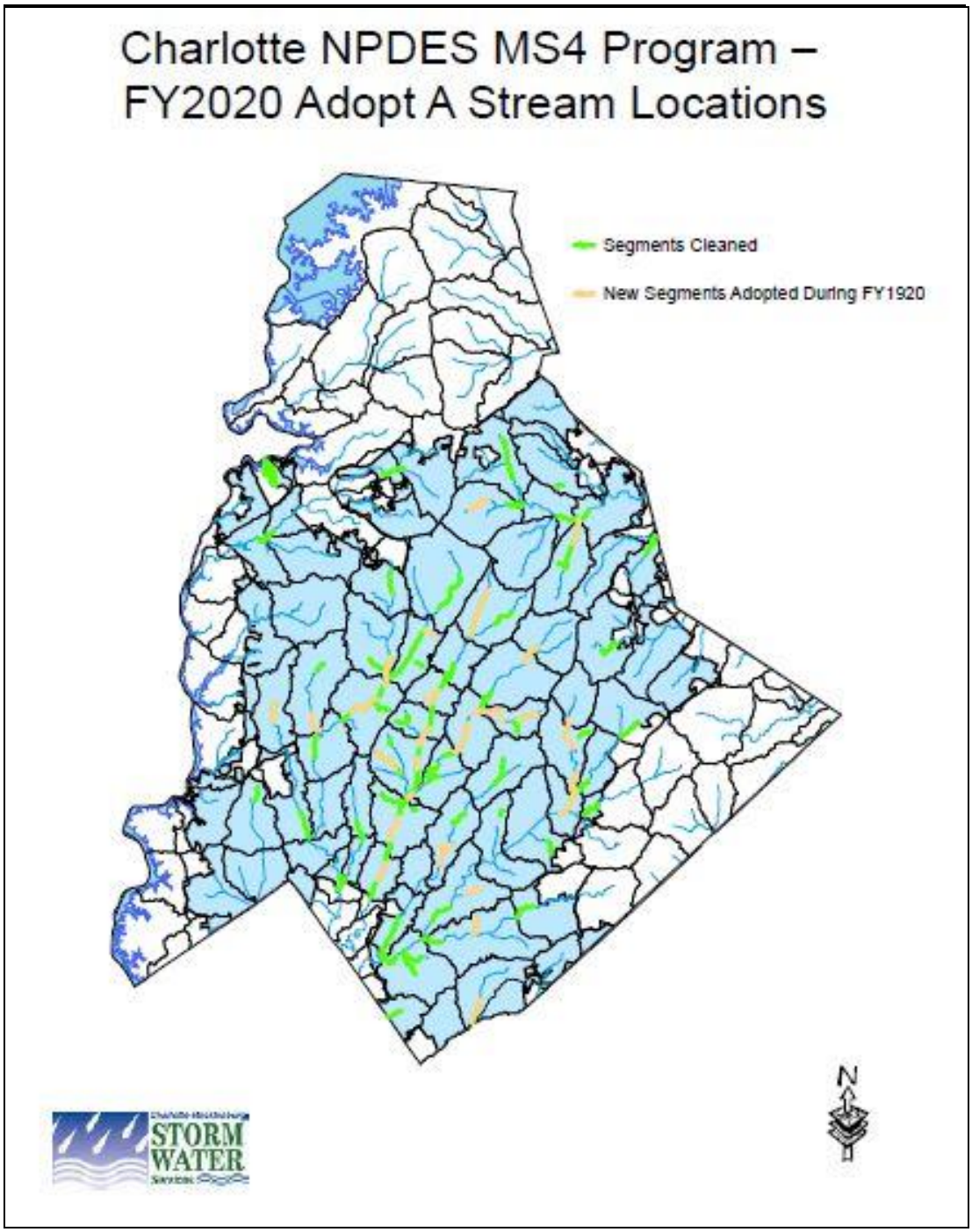

Charlotte NPDES MS4 Program - FY2020
Storm Drain Marking
FY1920 Phase I Storm Drains Marked
Streets
STORM WATER
N

FIGURE 4-3


Charlotte NPDES MS4 Program –
FY2020 Adopt A Stream Locations
Segments Cleaned
New Segments Adopted During FY1920
N
STORM
WATER

4.2.4 The Big Spring Clean

The Big Spring Clean is a one-day annual event promoted by CMSWS and the local organization Keep Mecklenburg Beautiful. The event is held on a selected Saturday morning during the spring season and typically provides seven to nine locations where citizens can go to remove trash from local streams. These locations are conveniently situated at greenway trailheads with ample parking and staffed by CMSWS to provide the volunteers with supplies, drinks and snacks. CMSWS coordinates the logistics during this event and collects statistics such as number of volunteers participating, volunteer hours, and the amount of trash removed at each location. CMSWS also coordinates with the Mecklenburg County Parks and Recreation Department to have the collected trash removed and properly disposed.

Table 4-2 shows the data relative to this program for the report period for local waterways at various locations throughout the City and **Figure 4-4** shows one of the promotional information items used for the event.

Figure 4-4: Big Spring Clean Utility Bill Insert

4.2.5 Volunteer Monitoring Program

The Volunteer Monitoring Program was expanded after discussion and analysis led staff to determine that, based on the amount of time and staff resources expended, not enough volunteers were being recruited for the existing program. Additionally, volunteers for the most part were not being consistent with conducting monitoring and submitting data.

The Visual Assessment and Snapshot Assessment were continued as a result of the discussion and analysis. For the visual assessment program, volunteers are trained in workshops about surface water quality, common stream pollutants, and how to identify them. Trained individuals then select a stream site from among a list and agree to send in qualitative, visual assessment forms every month for their assigned sites.

The Snapshot Assessment program is available to all citizens without having to attend a workshop. Three signs were posted along stream greenways that have a number for people to text a picture and report the condition of the stream. Staff then follow up on any reports of pollution. Most of the pictures are of trash, but there were several that were verified as pollution sources.

Existing volunteer monitoring programs including stream chemical monitoring and macroinvertebrate monitoring continues; however, rather than holding weekend workshops to recruit volunteers as was done previously, staff now trains volunteer groups upon request. These programs tend to be most popular among school groups. **Table 4-3** shows the data relative to this program for the report period and **Figure 4-5** shows workshop attendees receiving training.

Figure 4-5: Volunteer Monitoring workshop attendees learning sampling techniques

Table 4-3: Public Involvement Program Results

Activity	Results
Volunteer Monitoring training sessions	1
Volunteer Monitoring trainees	12
Volunteer Monitoring participants	121
Volunteer Monitoring participant hours	242
Volunteer Monitoring samples collected	20
Volunteer Monitoring visual observations made	119
Illicit discharges detected through this program[1.]	2
Second Saturday total events	8
Second Saturday volunteers	448
Second Saturday volunteer hours	448
Second Saturday Event – Stream Clean-ups	3
Second Saturday Event trash collected (tons)	1,225
Second Saturday Event – Tree Maintenance	1
Second Saturday Event – Storm Drain Marking	4
Tree planting volunteers	201
Tree planting volunteer hours	402
Trees planted by volunteers	428
Adopt-A-Street volunteers	684
Adopt-A-Street volunteer hours	5,837
Adopt-A-Street miles cleaned	455
Adopt-A-Street bags of trash collected	2,006
Adopt-A-Street bags of recyclables collected	400
SWAC meetings	8
Attendees at SWAC meetings	158

1. This data included in the total Illicit Discharges data shown in Table 5-14.

4.2.6 Second Saturday Volunteer Events

As a way to involve more citizens in volunteering to improve surface water quality, CMSWS maintains "Second Saturday" events. These events have taken place on the second Saturday of every month and ran typically from 9 am to 12 noon at different locations that are selected based on clean-up or maintenance needs. The events rotate between stream cleanups, tree maintenance, and storm drain marking. To make it easy for citizens to participate, registration is not required, and the location of each event is made known to the public the month prior to each event.

This program is quite popular and successful mostly because it allows citizens to participate in a one-time event as opposed to our other programs that require a longer-term commitment. Plans are to continue the events through the next fiscal year at a minimum. **Table 4-3** shows the data relative to this program for the report period.

4.2.7 Tree Planting Program

The City and CMSWS maintain various tree planting programs where citizens can volunteer to plant and maintain trees on select public property and project sites. This effort helps to stabilize soil and reduce stormwater runoff. **Table 4-3** shows the data relative to this program for the report period.

4.2.8 Adopt-A-Street Program

The City's Keep Charlotte Beautiful program maintains an Adopt-A-Street program where citizens can volunteer to adopt a section of roadway to remove trash and litter. This effort helps to keep trash from entering the storm drain system and streams. **Table 4-3** shows the data relative to this program for the report period.

4.3 Public Involvement Mechanism

The City of Charlotte and Mecklenburg County established a citizen Storm Water Advisory Committee (SWAC) during 1994 in conjunction with the development of their stormwater utility (CMSWS).

SWAC members are nominated and subsequently appointed by the Mecklenburg Board of County Commissioners, Charlotte City Council, Charlotte Mayor and Town Boards. SWAC includes residents from the City of Charlotte. SWAC serves as the City's stormwater management citizen advisory panel for involving the public in the development and implementation of the permit program. The SWAC reviews:

- Capital and operational programs;
- Appeals;
- Stormwater program policies;
- Long-range plans; and

- Budgets.

These reviews assist CMSWS in making recommendations and offering comments to the City Council and the Board of County Commissioners on program matters and annual budgets. The committee also adjudicates appeals for erosion control violations, pollution control violations, service charges, and fee credits and adjustments. **Table 4-3** shows the data relative to this program for the report period.

4.4 Public Reporting Mechanisms

The City, in cooperation with Mecklenburg County, operates a joint customer service hotline to receive information about a variety of concerns. Citizens can call 311 to report pollution, flooding, and blockages to the drainage system as well as request other City/County services. The 311-call center is staffed to receive calls Monday through Friday from 7 am to 7 pm. Citizens can also submit requests for service to 311 at any time by using the CLT+ app or by going online to the "Report a Problem" section of the website. All personnel from the customer service group receive training on stormwater issues and pollution to ensure calls are directed to appropriate personnel and handled in a timely manner. The training manual for 311 staff is reviewed and updated periodically to ensure information and resources are accurate.

4.5 Public Review and Comment Opportunities

In FY2020, the City provided opportunities for public review and comment in the implementation of its permit and SWMP Plan through website information. The City also provided opportunities for review and comment on revisions to its Stormwater Pollution Control Ordinance.

4.6 Public Notice

During the report period the City updated its Stormwater Pollution Control Ordinance. Public notices were issued on January 21st and 22nd, 2020 and May 1st and 8th, 2020 to solicit public review and comment as well as announce public meetings and hearings. Letters about proposed ordinance revisions were also sent to 18 trade associations who represent businesses potentially affected by the ordinance. As a result of that letter, representatives from both the Charlotte Real Estate and Building Industry Coalition and the Charlotte Apartment Association met with CMSWS staff several times to provide input, resulting in a number of revisions to proposed ordinance language.

4.7 Measurable Goals/Planned Activities for Future Program Years

Table 4-4 describes the various Public Involvement and Participation Program BMPs and the Measurable Goals and Planned Activities for Future Program Years for each BMP by permit term year.

Table 4-4: BMP Measurable Goals for the Public Involvement and Participation Program.

BMP	BMP Description	Measurable Goals (by permit term year)				
		1	2	3	4	5+
Volunteer community involvement program	The permittee shall include and promote volunteer opportunities designed to promote ongoing citizen participation.	Continue to maintain a public involvement and participation program that outlines campaigns and tools to encourage public involvement. (On-going, years 1 – 5+)				
Establish a Mechanism for Public involvement	The permittee shall provide and promote a mechanism for public involvement that provides for input on stormwater issues and the stormwater program.	Maintain the Stormwater Advisory Committee. (On-going, years 1 – 5+)				
Establish Hotline/Help line	The permittee shall promote and maintain a hotline/helpline for the purpose of public involvement and participation.	Maintain a hotline that receives information from the public 24 hours a day. (On-going, years 1 – 5+)				
Public Review and Comment	The permittee shall make copies of their most recent Stormwater Plans available for public review and comment.	Maintain an informational website which includes the SWMP available for review and comment. (On-going, years 1 – 5+)				
Public Notice	Pursuant to 122.34 the permittee must, at a minimum, comply with State, Tribal and local public notice requirements when implementing a public involvement/ participation program.	Comply with State and local public notice requirements when making major changes to the stormwater program and/or applying for permit renewals. (On-going, as needed)				

4.8 Program Assessment

The Public Involvement and Participation Program was successfully implemented during the annual report period. In addition, although not currently listed as a required BMP in the City's NPDES MS4 permit or SWMP, the City coordinates with Mecklenburg County to sponsor an annual Big Spring Clean event. Data on this additional program is included in the table below for reference. **Table 4-5** shows a summary of the various activities and corresponding results for activities conducted under the program.

Table 4-5: Program Summary

PUBLIC INVOLVEMENT PROGRAM	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024
Total Volunteers	3,859	2,648				
Total Volunteer hours	16,019	5,348				
Total miles cleaned (linear miles)	612	114				
Total trash collected (tons)	72	56				
SWAC meetings	9	8				
Attendees at SWAC meetings	167	158				

The City's Public Involvement and Participation Program provides a combination of activities that allows residents to be involved in the City's stormwater management program and the opportunity to comment on components of the City's plan to meet NPDES MS4 permit requirements. The following provides an overview of the program's effectiveness:

Storm Drain Marking Program: This year volunteer programs were all placed on hold in March 2020 due to COVID-19 restrictions. This eliminated 3.5 months of previously planned volunteer initiatives. Though storm drain marking events were cancelled, CMSWS continued to promote the program via social media. The program was promoted as an activity that could be done within a quarantining family unit and allowed for social distancing.

Adopt-A-Stream Program: The number of volunteers and volunteer hours increased during the report period. One-time stream clean-ups are becoming more popular with groups versus signing up to conduct two clean-ups per year, which has traditionally been required.

Big Spring Clean: The Big Spring Clean event was unable to be held due to COVID-19 restrictions. The event was scheduled to be held on March 28, 2020 at eight different locations. The Big Spring Clean event was promoted on television, radio, social media and a utility bill insert prior to being cancelled.

Volunteer Monitoring Program: Due to COVID-19 guidelines restricting group gatherings at county facilities, volunteer monitoring visual assessment workshops were cancelled in April 2020. In May 2020 an online volunteer monitoring visual assessment workshop module was developed for citizens in the community to take the training online.

Public Involvement Strategy: The purpose of the Public Involvement program is to provide an opportunity for citizens to get involved in activities aimed at protecting and improving surface water quality. Our various volunteer programs are promoted via traditional media such as television and radio and on social media platforms. Staff meets quarterly in order to communicate about participation and to determine changes that need to take place in order to continue to be successful.

SWAC meetings: Meeting frequency and participation continues to be maintained. These meetings continue to be a highly effective method for involving the public in policy decisions related to the overall stormwater program.

Public Hotline/ Helpline: The 311-hotline continued to be a successful tool for allowing the public to report water pollution problems. Use of the Water Watchers app by the public as a reporting tool has declined over the past couple years. The reason for this decline is theorized to be that so many smartphone apps are now available that people are deleting the ones they do not use very often. CMSWS staff discussed this issue and decided to discontinue use of the Water Watchers app. The City created a new citizen reporting app called CLT+ which includes the ability to report stormwater service requests. Staff has begun including information about this new app in outreach messaging.

Section 5: Illicit Discharge Detection and Elimination (IDDE) Program

During the annual report period, staff implemented the Illicit Discharge Detection and Elimination ("IDDE") program to identify and eliminate sources of pollution to the MS4 per the SWMP. The following sub-sections explain:

- The BMPs implemented to meet program requirements;
- Measures of success;
- Future goals and planned activities; and
- Program assessment.

5.1 BMP Summary Table

Table 5-1 provides information concerning the BMPs implemented to fulfill the IDDE Program requirements.

Table 5-1: BMP Summary Table for the Illicit Discharge Detection and Elimination Program.

BMP	BMP Description	Schedule (years)					Responsible Position
		1	2	3	4	5	
Maintain appropriate legal authorities	Maintain adequate ordinances or other legal authorities to prohibit illicit connections and discharges and enforce the approved IDDE Program.	X	X	X	X	X	Water Quality Program Manager
Maintain a Storm Sewer System Base Map	The permittee shall maintain a current map showing major outfalls and receiving streams.	X	X	X	X	X	Water Quality Program Manager
Inspection /	Maintain written procedures and/or Standard	X	X	X	X	X	Water Quality

detection program to detect dry weather flows at MS4 outfalls	Operating Procedures (SOPs) for detecting and tracing the sources of illicit discharges and for removing the sources or reporting the sources to the State to be properly permitted. Written procedures and/or SOPs shall specify a timeframe for monitoring and how many outfalls and the areas that are to be targeted for inspections.						Program Manager
Employee Training	Conduct training for appropriate municipal staff on detecting and reporting illicit connections and discharges.	X	X	X	X	X	Water Quality Program Manager
Maintain a public reporting mechanism	Maintain and publicize reporting mechanism for the public to report illicit connections and discharges. Establish citizen request response procedures.	X	X	X	X	X	Water Quality Program Manager
Documentation	The permittee shall document the date of investigations, any enforcement action(s) or remediation that occurred.	X	X	X	X	X	Water Quality Program Manager

5.2 Ordinance Administration and Enforcement

The City adopted its original Stormwater Pollution Control Ordinance (SWPCO) on January 30, 1995 for the initial NPDES MS4 permit term. The ordinance was subsequently updated and amended on March 22, 2004, June 9, 2008, and most recently on May 26, 2020 with the latest revisions effective on July 1, 2020. The most recently adopted revision included increasing the maximum penalty per violation, per day from $5,000 to $10,000. Also, a prohibition against pavement sealants with polycyclic aromatic hydrocarbons (PAHs) greater than 0.10% by weight was added. This effort was a culmination of a multi-year research and local monitoring study. Other revisions were included to improve the clarity and effectiveness of the ordinance.

The ordinance continues to be implemented as part of the NPDES MS4 permit program and SWMP. All procedures and guidelines for proper administration and enforcement of the ordinance are reviewed and updated, as necessary. These procedures and guidelines along with all other information relevant to the IDDE program are included in the IDDE Manual.

During FY2020, the ordinance maintained four sections from the June 2008 version that are considered prohibitions (violations) for which the issuance of a Notice of Violation ("NOV") and/or other enforcement remedies is authorized. Those sections are:

- Section 18-80(a) Illicit Discharges and Disposals;
- Section 18-80(b) Illicit Connections;
- Section 18-80(c) Accidental Discharges; and
- Section 18-80(d) Obstruction.

SWPCO data has been maintained since the inception of the program in FY1995. Determined violations of the SWPCO result in the issuance of an NOV and additional enforcement measures, such as civil penalty assessment, when deemed necessary. Historically, the majority of discovered violations have occurred under Section 18-80(a) with many of these being either for the improper disposal of materials or washwater, or the illicit discharge of sewage.

Tables 5-2 and 5-3, and Figures 5-1, 5-2, and 5-3 show the data relative to the SWPCO program for the report period.

Table 5-2: SWPCO Program Results

Activity	Results
Cumulative NOVs issued since program inception (FY1995)	1,476
Cumulative civil penalties issued since program inception (FY1995)	84
Total NOVs issued	124
Total Civil penalties issued	13
Section 18-80(a) Illicit Discharges and Disposals violations	109
Section 18-80(b) Illicit Connections violations	1
Section 18-80(c) Accidental Discharges violations	14
Section 18-80(d) Obstruction violations	0

Table 5-3: NOVs Issued per Material Category per Month

Material Category	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
Animal waste													**0**
Automotive fluids					1								**1**
Chemicals			1								1		**2**
Concrete/Mortar	3	1	1	2	1	2		2	1				**13**
Diesel fuel		1	1				1			1	1		**5**
Food waste/grease/oil	1	4	3	3	1	2	2		1	2	2	2	**23**
Gasoline								1					**1**
HDD slurry			2	1				2					**5**
Heating oil				1				2					**3**
Hydraulic oil									1	1			**2**
Illicit connection												1	**1**
Kerosene													**0**
Motor oil			2									1	**3**
Other-specify													**0**
Paint			1	1				1	2	1	1	1	**8**
Plaster/Drywall								1					**1**
Process water													**0**
Pvt. Comm./Indust. SSO		1	2	1	1			1		2		1	**9**
Pvt. Multi-family SSO	3	2					1	4	1	2			**13**
Pvt. Single-family SSO	1	1	1	2		2	3	4	3		1	1	**19**
Sealants				1									**1**
Sediment		1		2					1	1			**5**
Solvents													**0**
Swimming pool water													**0**
Trash/Debris		1								1			**2**
Washwater				1			1		1	1	1	1	**6**
Wastewater			1										**1**
Yard waste													**0**
TOTALS	**8**	**12**	**15**	**15**	**4**	**6**	**8**	**18**	**11**	**12**	**7**	**8**	**124**

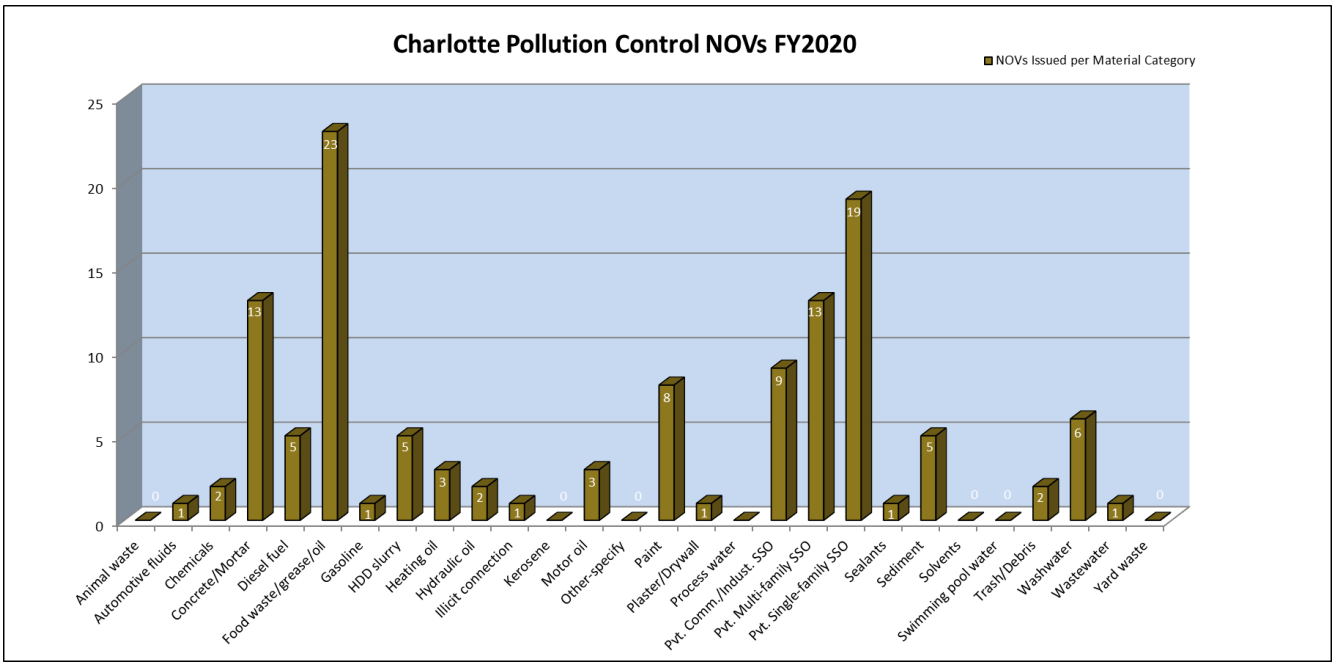


Figure 5-1: NOVs issued by material category.

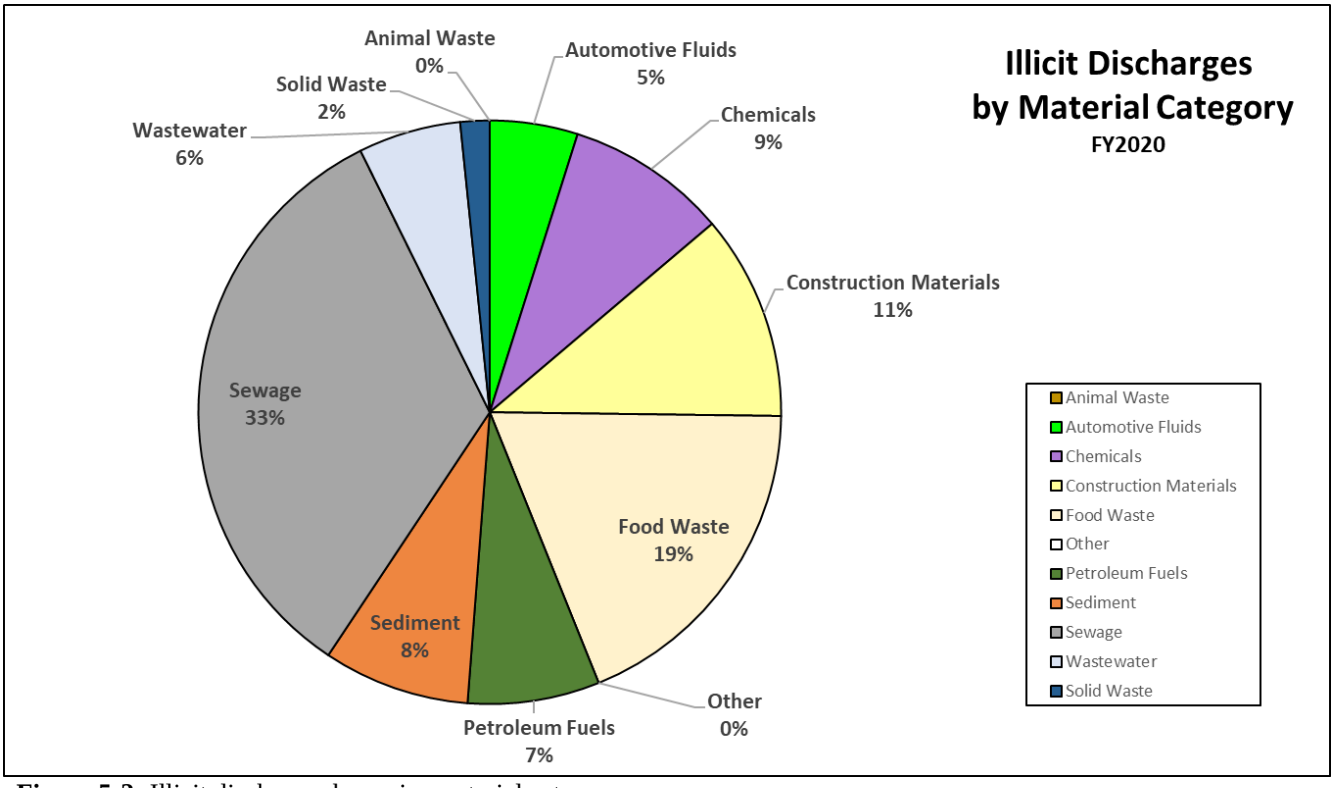


Figure 5-2: Illicit discharges by major material category.

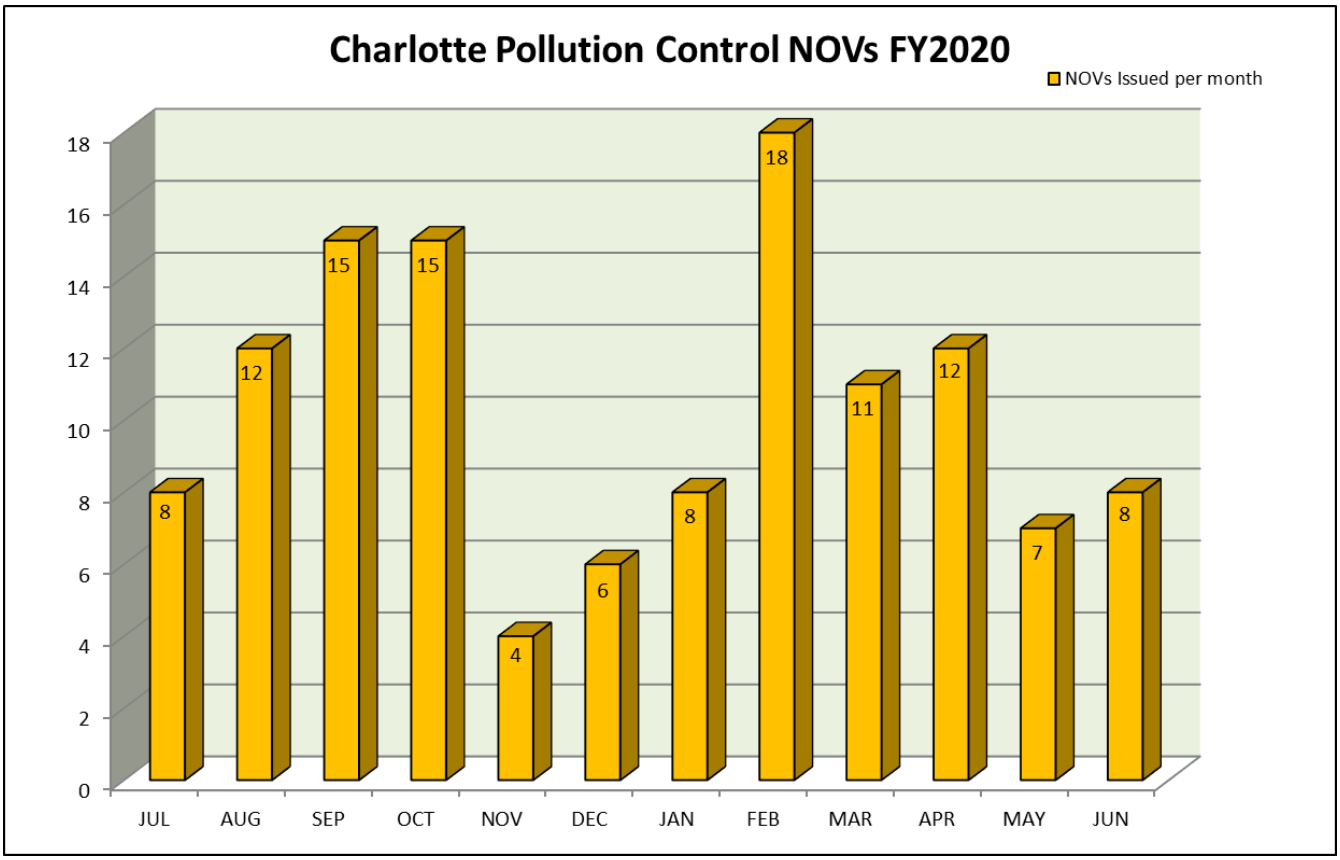


Figure 5-3: NOVs issued per month.

5.3 Stormwater System Inventory and Storm System Base Map

The City collects stormwater system inventory using a Stream Walk Program and a Stormwater Inventory Program.

Stream Walk Program: This program focuses on CMSWS staff walking stream channels to inspect outfalls, identify and collect data on new outfalls, and to identify dry weather flows. Stream walks are scheduled in every sub-basin within the City at least one time every five years. All Stream Walk Program data is transferred to the City's Inventory Program annually.

A five-year stream walk plan is maintained based on an analysis of the previous five-year stream walk program and the following conclusions:

- The high priority basins (history of poor surface water quality and illicit discharges) that were walked every other year did not result in a significant number of new outfalls or illicit discharges as compared to the other basins.

- The large number of miles walked in the high priority basins each year made it difficult for staff to walk different basins if the need is identified.

The analysis led to changes in protocol to develop the new five-year stream walk plan that groups the sub-basins by watershed in both the City and Mecklenburg County. Roughly the same number of miles are walked each year as previously, but the plan also allows for a 20-mile per year reserve that can be used for walking in any basin(s) when the need is identified. **Figure 5-4** shows the five-year (FY2018 – FY2022) stream walk plan and **Figure 5-5** shows the sub-basins that were walked during the report period.

Stormwater Inventory Program: This program verifies the outfall data collected by the Stream Walk Program and collects additional data on other components of the stormwater system such as catch basins, inlets, pipes, etc. The Inventory Program also collects stormwater infrastructure data from the analysis of new development and municipal project areas received from the GSD-SWS Design and Engineering Teams, and GSD Engineering Services and Land Development divisions. All inventory data receives quality assurance/quality control ("QA/QC") and is converted digitally into GIS.

Table 5-4 shows the data relative to the stormwater system inventory program for the report period.

Table 5-4: Stormwater Inventory Program Results

Activity	Results
Stream walk sub-basins assessed	18
Stream walk stream miles assessed	196
New outfalls identified	178
Existing outfalls QA/QC'd	437
Inventory sub-basins evaluated	40
Inventory square miles evaluated	35
Pipe miles inventoried	355
Open drainage miles inventoried	145
Stormwater features inventoried	49,082
Development projects added	238

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FIGURE 5-4

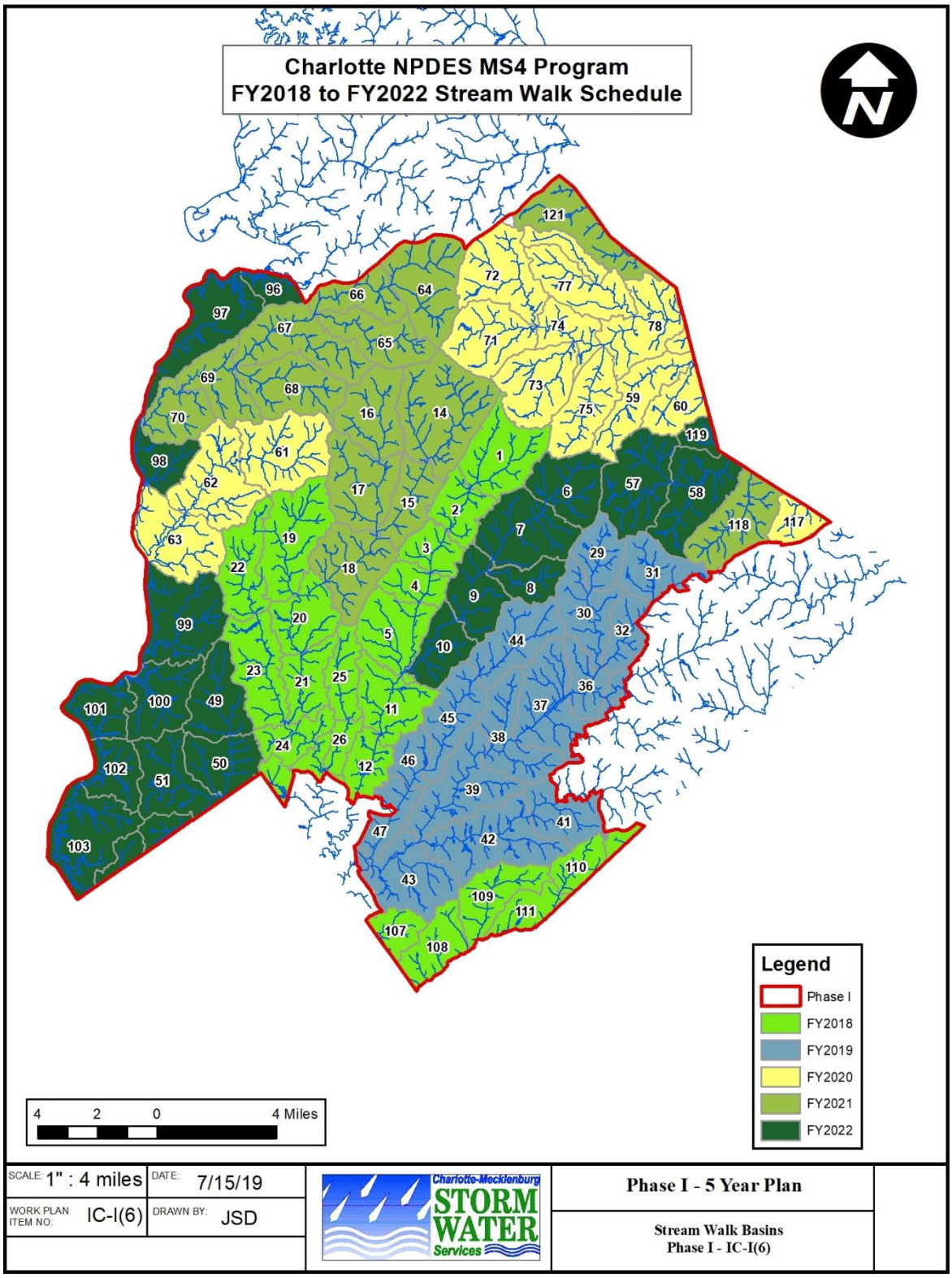
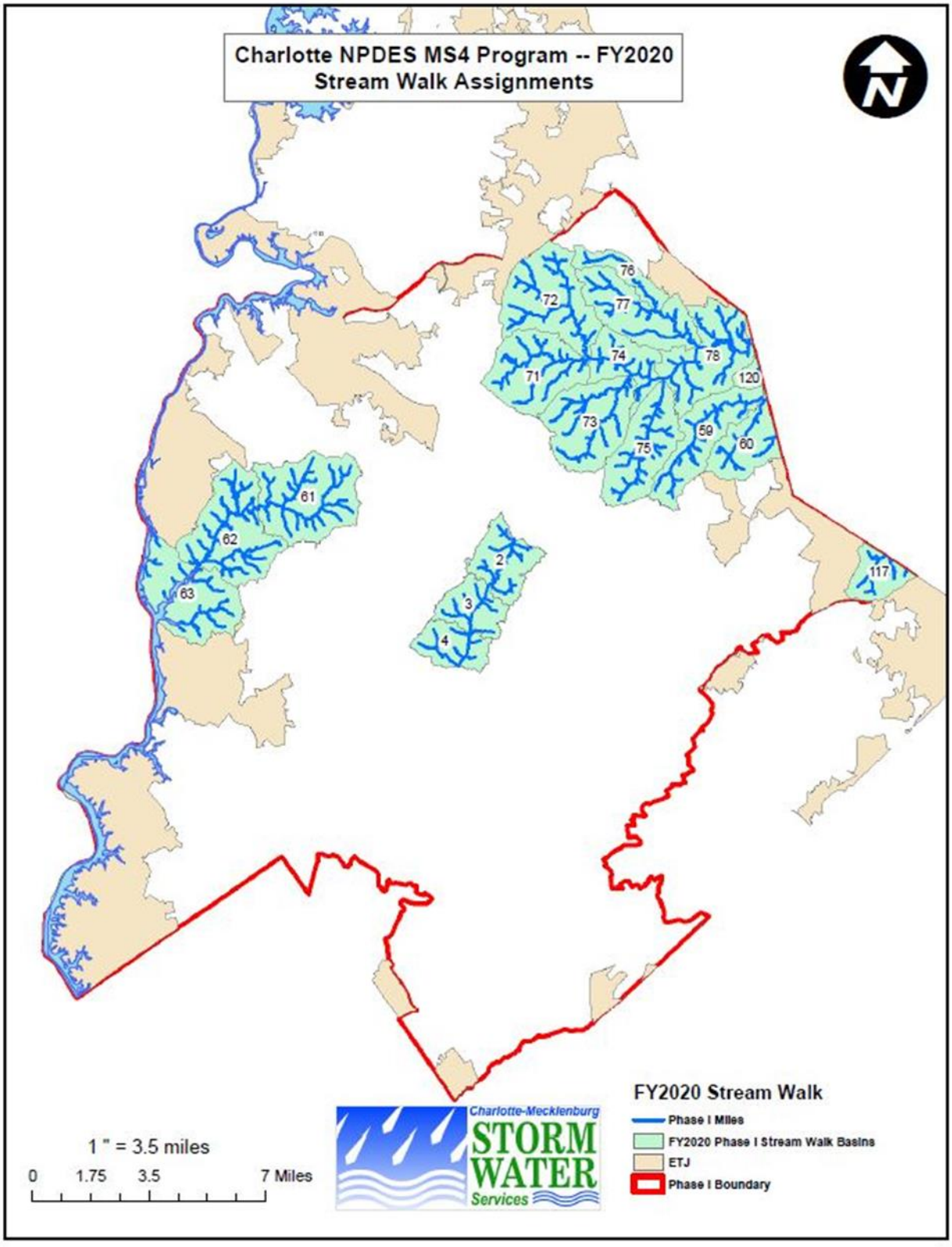

Charlotte NPDES MS4 Program
FY2018 to FY2022 Stream Walk Schedule
N
Legend
Phase I
FY2018
FY2019
FY2020
FY2021
FY2022
4 2 0 4 Miles
SCALE: 1" : 4 miles
DATE: 7/15/19
WORK PLAN ITEM NO: IC-I(6)
DRAWN BY: JSD
Charlotte-Mecklenburg STORM WATER Services
Phase I - 5 Year Plan
Stream Walk Basins
Phase I - IC-I(6)

FIGURE 5-5


Charlotte NPDES MS4 Program -- FY2020
Stream Walk Assignments
N
76
72
77
74
78
71
120
73
59
75
60
61
62
63
2
3
4
117
1 " = 3.5 miles
0
1.75
3.5
7 Miles
Charlotte-Mecklenburg
STORM WATER
Services
FY2020 Stream Walk
Phase I Miles
FY2020 Phase I Stream Walk Basins
ETJ
Phase I Boundary

5.4 Illicit Discharge Detection and Elimination Program

5.4.1 Outfall Inspection and Dry Weather Flow Detection

Each year select sub-basin outfalls are inspected for physical condition, the presence of dry weather flows (DWFs), and illicit discharges. These inspections are primarily conducted during Stream Walks and Hot Spot Investigations. Standard Operating Procedures for these activities are documented in the NPDES MS4 IDDE Manual and reviewed and updated periodically. Outfall inspections also occur during service request and field investigations, municipal facility inspections, and industrial facility inspections.

Stream Walk Program: As discussed in Section 5.3, this program involves CMSWS staff walking the stream channel to inspect outfalls, sample DWFs, and document a variety of other surface water quality related problems. Various reasons make it impossible to sample all DWFs including very low flows (seepage), frozen water, etc. DWFs are sampled for physical parameters (temperature, conductivity, pH, etc.), fecal coliform and total phosphorus. Staff also conduct qualitative observations of DWFs for signs of pollution such as color, odor, clarity, suds, oil sheen, etc. Staff also document stream blockages, areas of severe stream bank erosion, wetlands and new stream reference reaches as they observe them. **Table 5-5** shows the data relative to the outfall inspection and DWF detection program for the report period.

Table 5-5: Outfall Inspection and DWF Program Results

Activity	Results
Total outfalls inspected	802
Outfalls inspected during stream walks	615
Outfalls inspected during service requests/field investigations	6
Outfalls inspected during municipal inspections	118
Outfalls inspected during industrial inspections	63
DWFs detected	49
DWFs sampled	6
Fecal Coliform samples collected	6
Total Phosphorus samples collected	5
Fecal Coliform results investigated	6
Illicit discharges detected through this program[1.]	6
Municipal SSOs reported to CW	151
Stream blockages detected/reported	45
Severe stream bank erosion areas detected/recorded	4
Other potential issues detected	12

1. This data included in the total Illicit Discharges data shown in Table 5-14.

5.4.2 Surface Water Quality Monitoring

Surface water quality in-stream monitoring is used to identify problems and to track long and short-term surface water quality trends. The two main monitoring programs used to support IDDE efforts are the Fixed Interval and CMANN stream monitoring programs. The Fixed Interval program conducts in-stream monitoring for various chemical and physical parameters on a monthly basis and is discussed further in Section 10. The CMANN program is an automated

monitoring network that takes in-stream readings every 60 minutes at monitoring sites for dissolved oxygen, temperature, pH, conductivity, and turbidity. This parameter data is transferred to a database in real-time using cellular telemetry. **Figure 5-6** shows the monitoring locations for this program.

"Watch" and "Action" levels for the monitoring parameters are used as part of the program to determine when follow-up investigations are needed to address potential problems. The Watch and Action levels are based on state surface water quality standards and historical local data for the chemical and physical parameters. Exceedance of these levels triggers a field investigation. This program is discussed further in Section 10.

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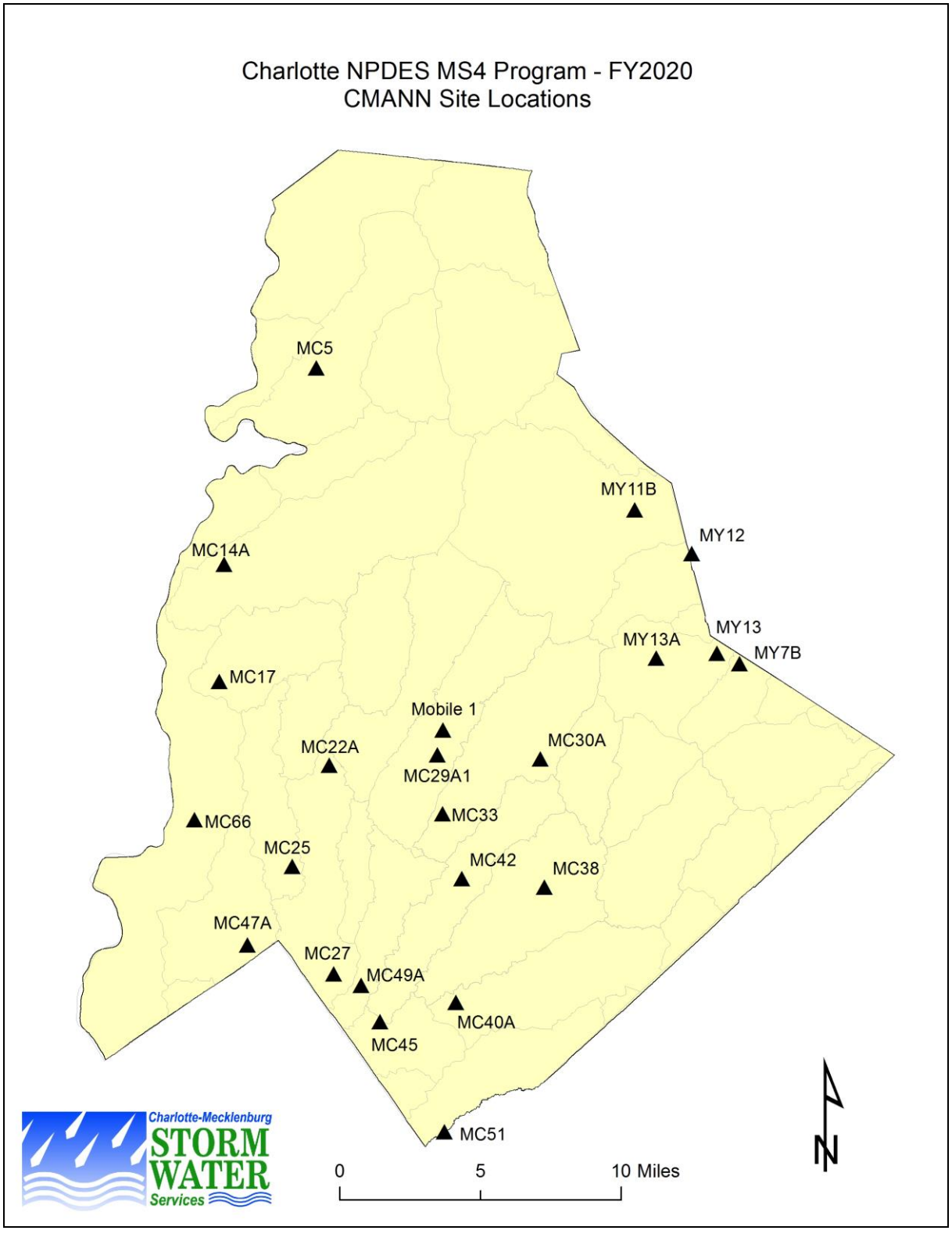
FIGURE 5-6


Charlotte NPDES MS4 Program - FY2020
CMANN Site Locations
MC5
MY11B
MY12
MC14A
MY13
MY13A
MY7B
MC17
Mobile 1
MC22A
MC30A
MC29A1
MC66
MC33
MC25
MC42
MC38
MC47A
MC27
MC49A
MC40A
MC45
MC51
Charlotte-Mecklenburg
STORM
WATER
Services
0
5
10 Miles
N

5.4.3 Illicit Discharge Elimination Program

The Illicit Discharge Elimination Program ("IDEP") is a sub-set of the overall IDDE program. This program conducts illicit discharge detection, investigation and outreach activities in areas where data and staff experience indicate the greatest likelihood for the occurrence of illicit discharges and/or poor housekeeping practices. The IDEP program has involved various activities that have changed over time, and that is by design. The point of the program is to be adaptable based on things like staff observations, data analysis, and emerging issues. In FY2020, the following activities were conducted:

- Hot Spot Investigations
- Multi-Family Residential Community Inspections
- Business Corridor Runs
- Industry-wide Investigations
- Pet Waste Flagging Campaign
- Inspection of facilities that were previously issued a SWPCO civil penalty

Standard operating procedures are in place to guide all IDEP program activities and protocols, which are reviewed and updated annually.

Hot Spot Investigations: This activity conducts investigations in areas where analysis of monitoring and/or service request data indicates a priority problem area. These investigations require more experienced staff with extensive field investigation expertise to locate sources of pollution in these priority areas. The field investigations typically include use of one or more of the following techniques:

- Establishing a temporary CMANN monitoring station;
- Collecting grab samples in tributaries, pipes, and manholes;
- Dye testing businesses and homes;
- Monitoring suspect facilities;
- Smoke testing sanitary sewers; and/or
- Conducting pipe video inspections.

Previous to FY2019, Hot Spot investigations included the identification of a priority sub-basin in which CMSWS staff would walk the sub-basin and sample minor outfalls to locate pollution sources and/or problems. From analysis of program data collected, this method was determined to be largely unsuccessful. As a result, Hot Spot Investigations methodology changed to that described above.

Figure 5-7: Overflowing manhole at a multi-family residential system

Hot Spot investigations that occurred this past year are summarized as follows:

- Worthington Drainage Basin, Irwin Creek Watershed: Work to identify sewage sources causing high bacteria levels in the drainage area of Worthington Avenue in South End. Despite the correction of a large sewage source in this area last year, bacteria levels remained above state standard. Staff moved the investigation into the higher portions of the drainage system and found one storm drain that looked to be gray water. Staff worked with the City Storm Water pipe video crew and observed what appeared to be a source; however, the camera was unable to get a clear picture and due to the size and configuration of the pipe, was unable to get any closer to make observations. Staff completed a dye testing of the entire building adjacent/above the pipe in question, but no evidence of dye was observed in the storm drain system; and

- Baxter Street Drainage Basin, Little Sugar Creek Watershed: High fecal coliform levels at a fixed monitoring site in Little Sugar Creek led staff to the Baxter Street drainage basin where they conducted a sampling investigation. This investigation became more difficult once the surface waters went underground into the storm drainage system. Some samples were able to be pulled from the storm drain system using a battery-operated hydrostatic pump. Sanitary sewer lines in the area (both private and public) were dye tested. No evidence of dye was observed in the storm drain system. No source has been detected at this time. Bacteria levels at the monitoring site decreased in subsequent sampling events.

Multi-Family Residential Community Inspections: This activity conducts inspections of privately maintained multi-family residential sewer systems to look for signs of problems with the operation and maintenance of these systems. CMSWS inspectors check system manholes and clean outs looking for signs of current or potential overflows and pipe blockages and/or evidence of previous problems such as limed areas, sewage solids on ground, etc. The multi-family systems are selected based on their sewer overflow history. **Table 5-6** shows the data relative to this program for the report period and **Figure 5-7** shows a sewage discharge from a multi-family system.

Business Corridor Runs: This activity conducts windshield surveys along streets throughout the City that have a high concentration of commercial businesses where illicit discharges and poor housekeeping practices may potentially be found. The surveys allow staff to quickly survey these business areas for the presence of practices such as dumping of washwater, mobile pressure washing, motor oil discharges from automotive maintenance practices, and cooking oil/grease discharges at restaurants. Staff also inspects storm drain inlets and outfalls in these areas when illicit discharges are suspected. **Table 5-6** shows the data relative to this program for the report period.

Industry-wide Investigations: This activity involves staff focusing on a specific industry or commercial business sector for inspections. There were no specific industry-wide inspections this past year. Some business sectors focused on in previous years include stone cutting (granite), dog daycares/kennels, and golf courses.

Pet Waste Flagging Campaign: This effort is maintained with the goal of reducing the amount of improperly disposed pet waste. Greenways and park areas known for pet waste problems are targeted and IDEP staff use small flags (i.e. utility marking flags) with messages of the environmental and health risks resulting from improper disposal of pet waste, specifically marking and drawing attention to visible obvious deposits of canine waste. Staff also use chalk to mark deposits in areas where the soil is too compact for the use of flags. Each week throughout April, staff visited these areas to mark pet waste deposits and educate residents. These activities were also combined with social media/on-line outreach, attendance at community events for pet owners, and interviews with local TV personalities and on-line media staff. **Table 5-6** shows the data relative to this program for the report period.

Inspection of Previously SWPCO Penalized Facilities : This program is new for FY2020 and inspects businesses that previously received a SWPCO civil penalty within the past three years. The purpose of these inspections is to verify these facilities are maintaining compliance with the SWPCO.

Table 5-6: IDEP Program Results

Activity	Results
Multi-family community inspections conducted	14
Business corridor business inspections conducted	1,170
Business corridor catch basin inspections conducted	171
Pet waste residents engaged with	10
Pet waste deposits marked	40
Inspections at previous SWPCO civil penalty facilities	18
Illicit discharges detected through this program[1.]	10

1. This data included in the total Illicit Discharges data shown in Table 5-14.

Figure 5-8 shows the locations where IDEP activities occurred and **Figure 5-9** shows the business corridors evaluated.

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FIGURE 5-8

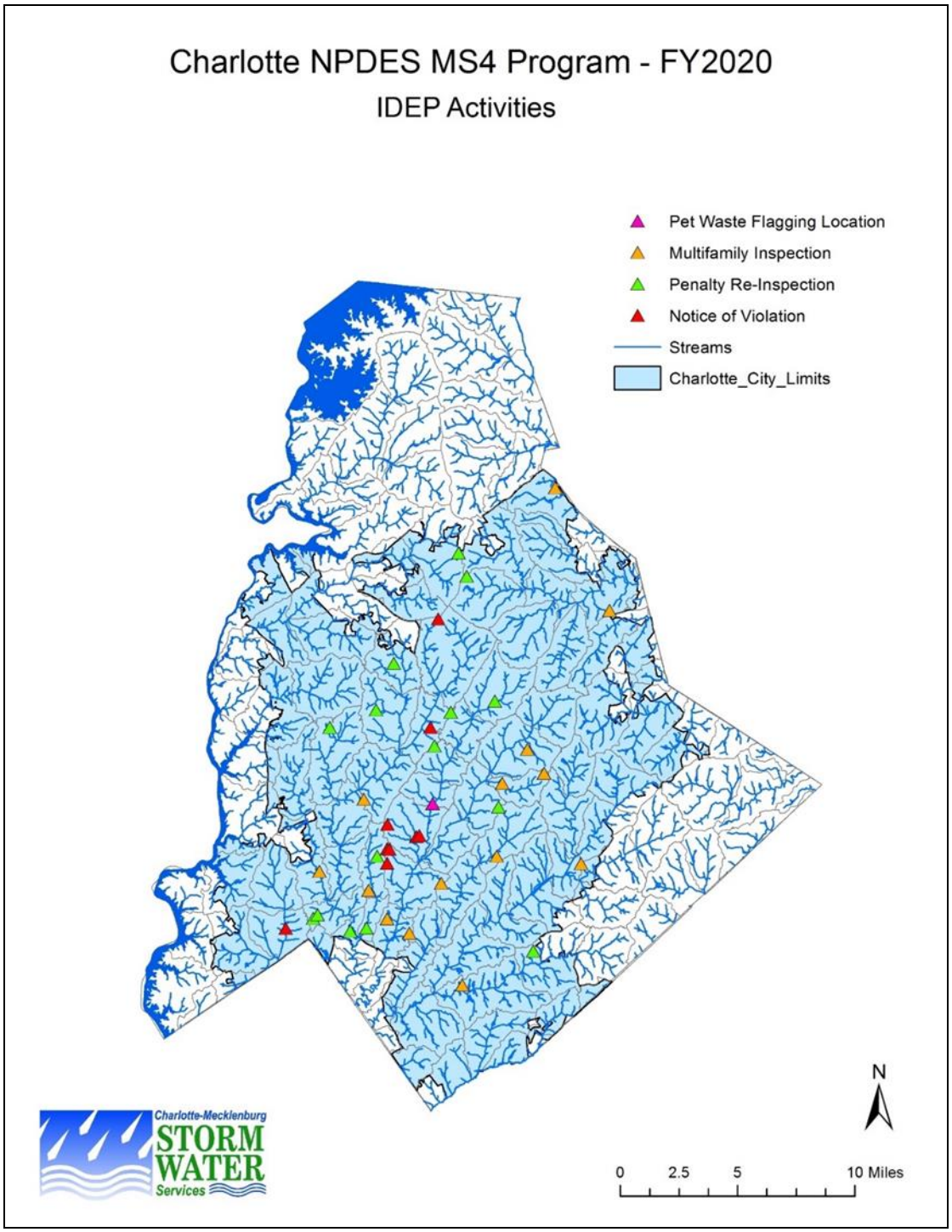
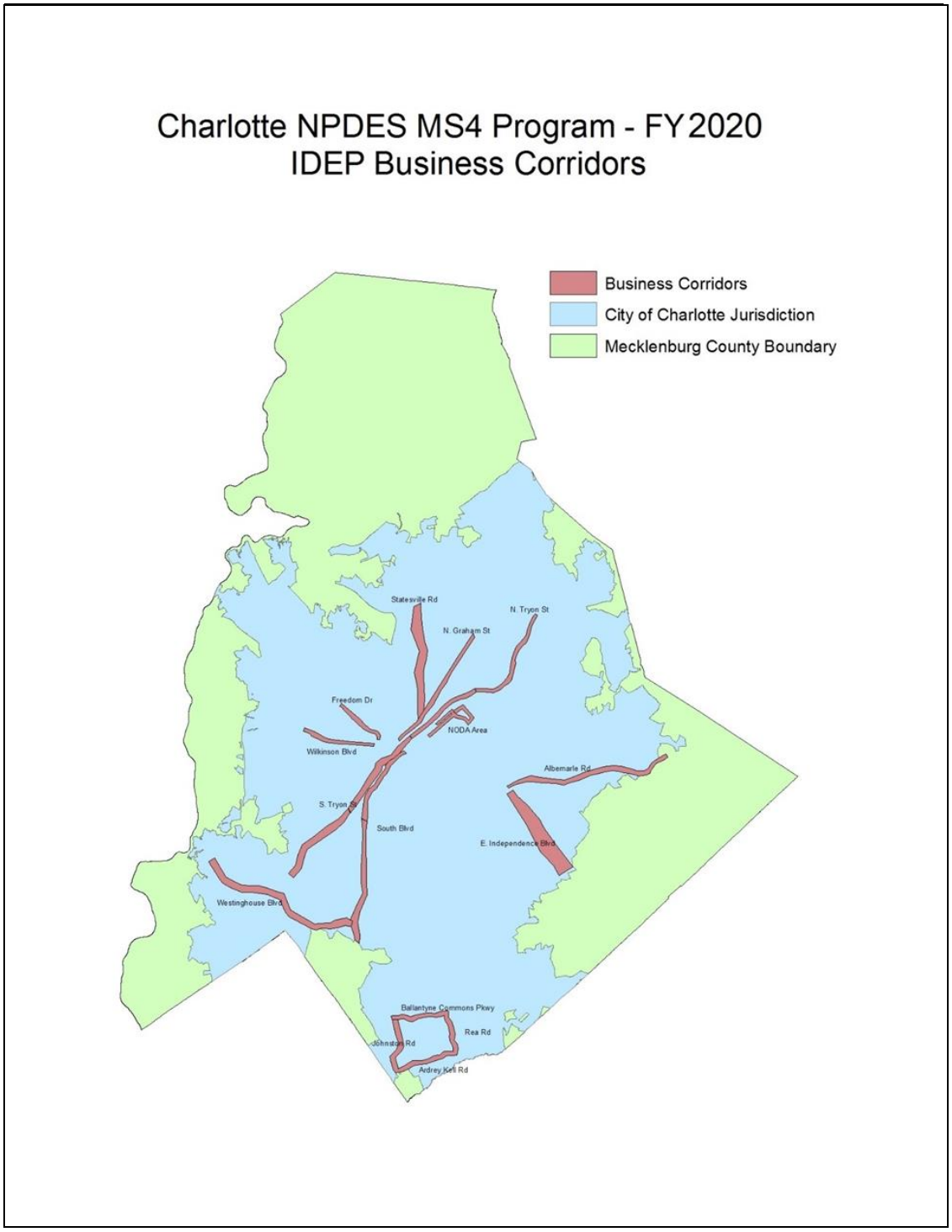

Charlotte NPDES MS4 Program - FY2020
IDEP Activities
Pet Waste Flagging Location
Multifamily Inspection
Penalty Re-Inspection
Notice of Violation
Streams
Charlotte_City_Limits
N
0
2.5
5
10 Miles
Charlotte-Mecklenburg
STORM
WATER
Services

FIGURE 5-9


Charlotte NPDES MS4 Program - FY2020
IDEP Business Corridors
Business Corridors
City of Charlotte Jurisdiction
Mecklenburg County Boundary
Statesville Rd
N. Tryon St
N. Graham St
Freedom Dr
NODA Area
Wilkinson Blvd
Albemarle Rd
S. Tryon St
South Blvd
E. Independence Blvd
Westinghouse Blvd
Ballantyne Commons Pkwy
Rea Rd
Johnston Rd
Ardrey Kell Rd

5.4.4 Sanitary Sewer Overflows and Septic System Discharges

CMSWS works with two separate City/County departments to reduce sources of bacteria from municipal system SSOs and private septic systems: Charlotte Water (CW) department and Mecklenburg County Groundwater and Wastewater Services.

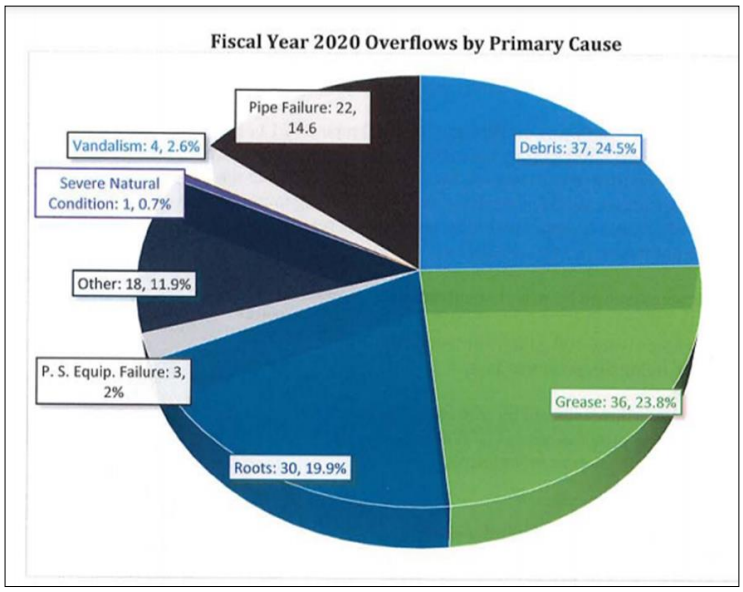


Figure 5-10: FY2020 SSOs by cause

Sanitary Sewer Overflows: CW is the City department responsible for operating the municipal water supply and sanitary sewer systems in the City. CW monitors the causes of SSOs and implements various system programs and maintenance activities to reduce SSO occurrences. **Table 5-7** shows the data relative to these programs for the report period and **Figure 5-10** shows the primary causes for these SSOs.

The City works to decrease SSOs in several ways, which include:

- Infrastructure maintenance and inspections (including lift stations);
- Capital improvement projects and capacity studies/reviews
- Rapid response team
- The Flow Free program
- Industrial pre-treatment program
- Multi-family residential program

A copy of Charlotte Water's current Wastewater Performance Report can be found here: https://charlottenc.gov/Water/Education/Documents/CLTWater2020WastewaterReportFinalSigned.pdf

Infrastructure maintenance and inspection: CW implements a number of infrastructure maintenance and inspection programs designed to reduce SSOs. **Table 5-7** shows the data relative to this program for the report period.

Table 5-7: Municipal Sanitary Sewer System Program Results*

Activity	Results*
Sewer System SSOs discovered/addressed	151
Sewer system SSO volume (gallons)	2,505,640
SSOs per 100 system miles	3
Sewer system lines inspected via CCTV (miles)	167
Sewer system lines replaced or repaired (miles)	13

Sewer system manholes replaced or repaired	264
Sewer system lines cleaned (miles)	1,058
Sewer system lines treated with root chemicals (miles)	406
Sewer system lines ROW cleared for access (miles)	101
Sewer system service connections replaced	223
Lift stations receiving regular inspection and maintenance	83

* This data not included in summary data shown in Table 5-14

Capital improvement projects and capacity studies/reviews: CW has many sewer system studies ongoing at any point in time which study items such as system conditions and capacity needs. Starting in 2009, CW began offering free capacity assurance reviews for new development to help determine whether existing collection systems can handle additional wastewater flows from new developments. These studies and reviews lead to projects that repair systems and/or expand capacity through pipe upsizing.

Rapid Response Team: CW has a Rapid Response Team available around the clock 365 days per year to respond to reports of SSOs. Their job is to respond as quickly as possible to reports, remedy overflows, and restore system flow. During FY2020, their average response time was 33 minutes.

Flow Free Program: CW's Flow Free Program focuses on reducing major contributors to SSOs including fats, oils, grease, wipes, and debris. Staff in this program perform the following inspection, enforcement, and education activities:

- Inspection of grease handling facilities at food service establishments and restaurants;
- Enforcement of the City's Sewer Use Ordinance including issuance of NOVs and Notices of Deficiency (NOD) as warranted;
- Implementation of the Flow Free education and outreach program to provide information on proper disposal of pipe-blocking items through the use of mailers, brochures, door hangers, presentations, social media, and TV ads.

Table 5-8 shows the data relative to this program for the report period.

Table 5-8: Sewer System Inspection and Education Program Results*

Activity	Results*
Food grease/oil handling inspections conducted	3,154
City sewer use ordinance NOVs issued	3
City sewer use ordinance NODs issued	117
FOG mailers issued	2,654
FOG brochures distributed	283
FOG presentations conducted	8
Citizens educated at FOG presentations	1,165

* This data not included in summary data shown in Table 5-14 and Table 3-11

Industrial Pre-treatment Program: CW operates an industrial pre-treatment program that identifies, permits, and regulates industrial users to keep unsuitable discharges out of the

collection system and treatment facilities. They conduct extensive monitoring to help determine compliance with user permits and enforce the City's Sewer Use Ordinance when violations are found. In FY2020

Table 5-9: Industrial Pre-Treatment Program Results*

Activity	Results*
Permitted facility inspections conducted	150
City sewer use ordinance non-compliance assessments issued	313
City sewer use ordinance civil penalties issued	46

* This data not included in summary data shown in Table 5-14 and Table 3-11

Multi-Family Residential Program:

CMSWS and CWD met twice this past fiscal year. During August 2019, staff met with the NCDEQ to share information about our programs that assist multi-family communities with compliance with NCDEQ regulations (15A NCAC 02T .0403 Permitting by Regulation) to develop and implement Operation and Maintenance plans for their private sewer collection systems. During that meeting, NCDEQ agreed to issue letters to communities that failed to produce Operation and Maintenance Plans after CMSWS sent letters explaining State requirements. In February 2020, CMSWS and CWD staff met again to discuss coordination and evaluation of activities. The multi-family program included:

- Updated master list of multi-family communities with data supplied by CW;
- Compiled a list of 50 priority communities for inspection;
- Informational letters about State requirements sent to priority list of multi-family residential communities;
- Education of multi-family community staff about State regulations and resources available from CMSWS and CW to help them comply with the regulations;
- Inspection of multi-family communities for completion and implementation of an Operation and Maintenance Plan for their private sanitary sewer system;
- Inspection of multi-family communities for problems in their private sanitary sewer systems such as built-up debris, flow anomalies, missing sewer clean-out caps, and evidence of recent overflows; and
- Issuance of SWPCO NOVs for violations such as SSOs from private sanitary sewer systems that result in an illicit discharge to the storm drainage system and/or surface waters.

In addition to the above, CW staff also conducted inspections of their system where SSOs occurred near multi-family communities and known areas of concern. They also conduct education and outreach including items like doorhangers, pop-up events, meetings with facility staff and residents, and social media.

Table 5-10 shows the data relative to this program for the report period and **Figure 5-11** shows the locations of the multi-family communities inspected by CMSWS.

Table 5-10: Multi-Family Community Program Results

Activity	Results
Multi-family informational letters issued by CMSWS	49
Multi-family inspections conducted	49
Operation & Maintenance Plans developed	16
Multi-family sewer system problems discovered	8
Illicit discharges detected through this program[1.]	7

1. This data included in the total Illicit Discharges data shown in Table 5-14.

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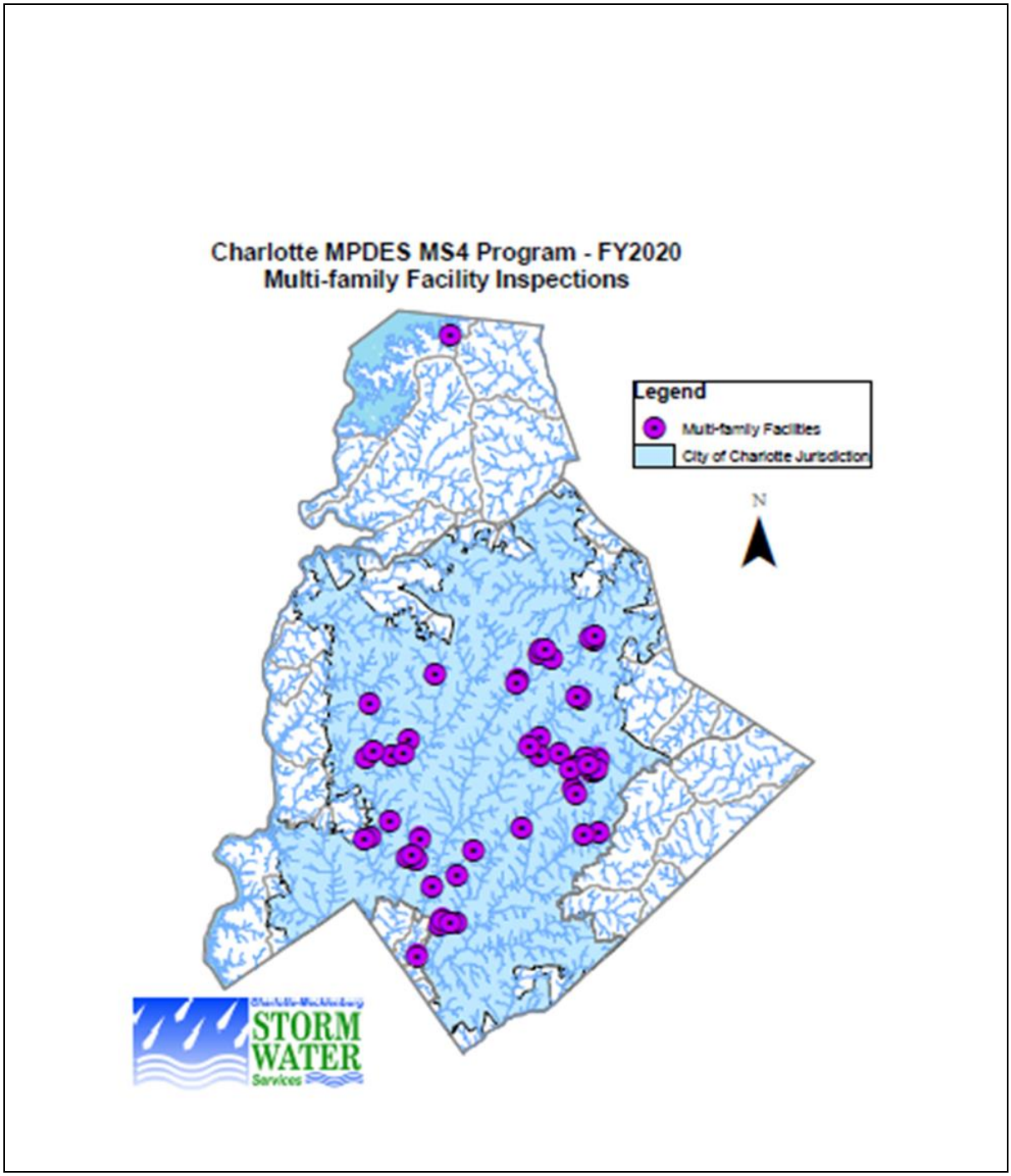
FIGURE 5-11


Charlotte MPDES MS4 Program - FY2020
Multi-family Facility Inspections
Legend
Multi-family Facilities
City of Charlotte Jurisdiction
N
STORM WATER
Services

Septic Systems: CMSWS works with Mecklenburg County Groundwater and Wastewater Services (GWWS) each year to monitor discharges from septic systems. The GWWS program conducts the permitting, inspections, education and enforcement activities related to septic systems. CMSWS reviews this information to look for potential impacts on surface waters and issues SWPCO NOVs typically when septic system discharges enter the stormwater system or surface waters. Failing septic systems discovered are either repaired or connected to the municipal sanitary sewer system, when possible. **Table 5-10** shows the data relative to this program for the report period and **Figure 5-12** shows locations of septic system failure activities.

Table 5-10: Septic System Program Results

Activity	Results
Total failing septic systems discovered	38
Failing septic systems connected to municipal sanitary sewer system	26
Failing septic systems repaired	12
Illicit discharges detected through this program[1.]	2

1. This data included in the total Illicit Discharges data shown in Table 5-14.

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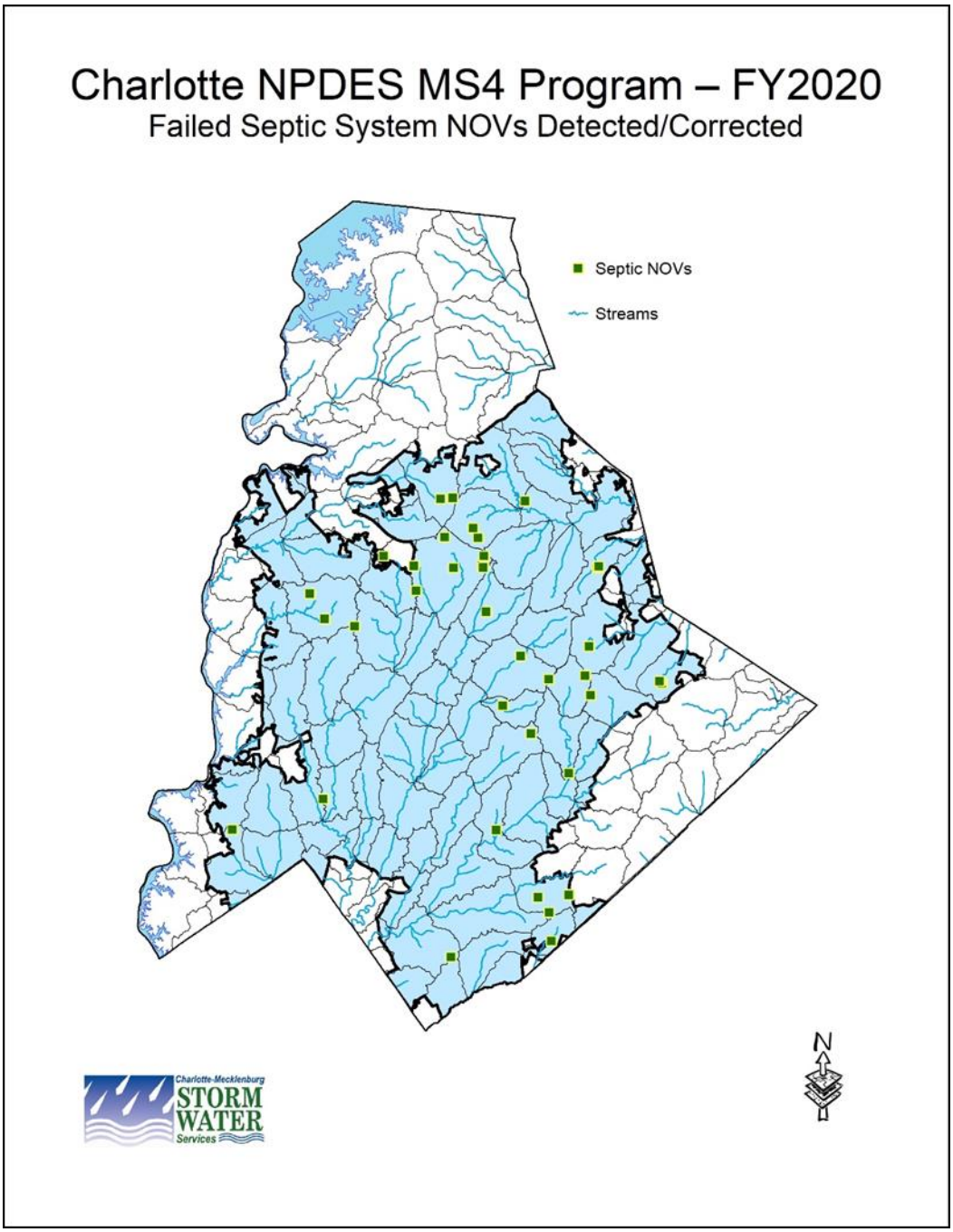
FIGURE 5-12


Charlotte NPDES MS4 Program – FY2020
Failed Septic System NOVs Detected/Corrected
Septic NOVs
Streams
N
Charlotte-Mecklenburg
STORM WATER
Services

5.5 Employee IDDE Training and Education

Employee IDDE Training and Education involves training municipal employees about the detection of illicit connections and discharges, and the various methods for reporting suspected pollution problems. Training is provided through a combination of the following methods:

- Staff meeting presentations;
- On-site, in-person training sessions;
- On-line training module; and
- Other methods such as online contests, posters, fliers, light box displays, emails, websites, and displays and information at employee gatherings

Staff meeting presentations: This method involves providing a presentation at a regularly scheduled staff meeting to provide information about identifying common illicit discharges in the community, the importance of reporting them, and the various methods that can be used to report them. Staff meeting presentations can also include workshops when internal staff attends and at least ten minutes are dedicated to providing information about identifying and reporting illicit discharges. **Table 5-11** shows the data relative to this program for the report period.

On-site, in-person training sessions: This method uses specially scheduled classroom style sessions that occur annually and include a power point presentation and video covering:

- Common illicit discharges in the community;
- How to detect them when they enter surface water;
- The importance of reporting them and the various ways they can report them as well as more in-depth pollution prevention information related to their facility and field work;
- Stormwater Pollution Prevention Plans;
- Spill prevention and response;
- Pollution prevention and the role of the employees to protect the environment and set an example for the community; and
- Results from recent facility inspections.

Presentations are given by CMSWS staff at all facilities except those operated by the Charlotte Area Transit System ("CATS") and the CLT Airport (trained professionals at those facilities do the training). The presentations provided by CMSWS and CATS are customized to reflect field work pollution prevention practices related to the audiences' daily work, the most recent facility inspection and a three-minute Spill Response Video which covers the importance of spill response. Presentations provided by the Airport are targeted at employees as well as contractors and vendors who are then responsible for training their own staff. **Table 5-11** shows the data relative to this program for the report period.

Table 5-11: Employee IDDE Training Program Results

Activity	Results
Total training sessions/presentations conducted	54
Total staff trained on IDDE	1,692

Activity	Results
Presentations at staff meetings	5
Employees trained at staff meeting presentations	270
On-site training sessions at municipal facilities	26
Employees trained at on-site sessions	423
Facilities assigned on-line training sessions	23
Staff trained via on-line training module	585
Staff trained via other methods	414

On-line training module: This method provides a power point presentation and video with narrated voiceover that is very similar to the on-site, in-person training session version, but allows field or shift-work staff to take the training at times more convenient for them. The training is assigned to staff and data is tracked through the City's web-based training system. **Table 5-11** shows the data relative to this program for the report period.

Other methods: Each year, other methods are used to reach internal staff with messages of report pollution. This year, an online contest was held called Stormy's Report Pollution Contest (**Figure 5-13**). Employees were asked to go to a webpage, read information about a common type of illicit discharge, and answer three questions for a chance to win a $25 gift card. A variety of channels were used to promote the contest such as:

Figure 5-13: Report Pollution Contest Poster

- A webpage slider with a link to the contest on our internal website;
- A weekly promotion and link to the contest in the employee e-newsletter;
- Graphics for light boards at four facilities,
- Promotion directly to Public Information Officers from various departments for inclusion in their own departments' e-news; and
- Posters for field facilities.

For each week of the contest, there was a different illicit discharge highlighted through promotional graphics and webpage information. The themes this year were: indoor cleaning wash water, yard waste and grass clippings, pool discharges, construction erosion control.

Unfortunately, the contest was cut short one week due to the 2020 COVID-19 pandemic, but the goal was still accomplished to increase participation over the previous year.

5.6 Public Reporting Mechanisms

The City, in cooperation with Mecklenburg County, operates a joint customer service hotline to receive information about a variety of concerns. Citizens can call 311 to report pollution, flooding, and blockages to the drainage system as well as request other City/County services. The 311-call center is staffed to receive calls Monday through Friday from 7 am to 7 pm. Citizens can also submit requests for service to 311 at any time by using the CLT+ app or by going online to the "Report a Problem" section of the website. All personnel from the customer service group receive training on stormwater issues and pollution to ensure calls are directed to appropriate personnel and handled in a timely manner. The training manual for 311 staff is reviewed and updated periodically to ensure information and resources are accurate. The City promotes this hotline throughout all of the activities provided as part of the Stormwater Public Education and Outreach Program. GSD-SWS works with the 311-customer service group to make sure calls are directed to appropriate personnel and/or are handled in a timely manner. The hotline/help line is discussed further in sub-section 3.4.3.

5.6.1 Public Education and Outreach

The City maintains a public education and outreach program to inform businesses, industries and the public about illicit discharges and improper waste disposal and how they impact the environment. This education and outreach program includes instructions regarding the proper method for reporting illicit discharges. The primary education and outreach mechanisms used are:

- Media campaign (included mass media and social media);
- Website;
- Utility bill inserts;
- Handouts/brochures/environmental notices;
- Public events; and
- In-person education and training sessions.

Handouts, brochures, and notices are reviewed and revised as necessary and distributed during the performance of facility inspections, when responding to citizen requests for service, and at event displays. These public education and outreach items for the IDDE Program are included as a component of the Public Education and Outreach Program described in more detail in Section 3.

Commercial Sector Education and Outreach

Certain businesses can be frequent sources of illicit discharges and connections. To improve compliance and reduce the number and severity of illicit discharges coming from the commercial sector, the City proactively provides education to certain commercial business sectors each year.

CMSWS provides 16 two-page best practices publications and guidance documents for commercial sectors available on-line. CMSWS also distributes these publications as part of

service requests, mailings, training sessions and public events. The following provides a complete list of the commercial sector publications that are utilized:

- Landscape Maintenance
- Pressure Washers
- Mobile Vehicle Detailers
- Food Service Industry
- Managers of Apartments and Condos
- Asphalt Sealing
- Carpet Cleaning
- Commercial Property Management
- Concrete
- Horizontal Directional Drilling
- Painting
- Swimming Pools and Spas
- Rooftop Work
- Stone Cutting
- Vehicle and Equipment Repair
- Municipal Contractors

During FY2019, CMSWS started a long-term effort to update all the BMP flyers to a new format. This format reduces wording and focuses on the most important information for prevention and response to illicit discharges relevant in the relevant industry. Each year, CMSWS plans to update two flyers per year until they have all been updated. This past reporting year, BMP flyers were updated for the Indoor Cleaning and Pool and Spa Maintenance industries.

Indoor Cleaning Industry: CMSWS updated the previous Carpet Cleaning flyer and renamed it Indoor Cleaning to address the myriad of businesses that could potentially dump their waste water from cleaning. The Indoor Cleaning flyer was also translated into Spanish (**Figure 5-14**).

CMSWS then worked with Mecklenburg County to send a letter and the updated flyer to indoor cleaning businesses in the Charlotte region. These businesses were found through searches with the Better Business Bureau, online search engines, and the City's registered vendor database. The letter notified recipients of both the City and County Stormwater Pollution Control Ordinances and that disposing of wastewater from indoor cleaning is an illicit discharge. **Table 5-12** shows the data relative to this program for the report period.

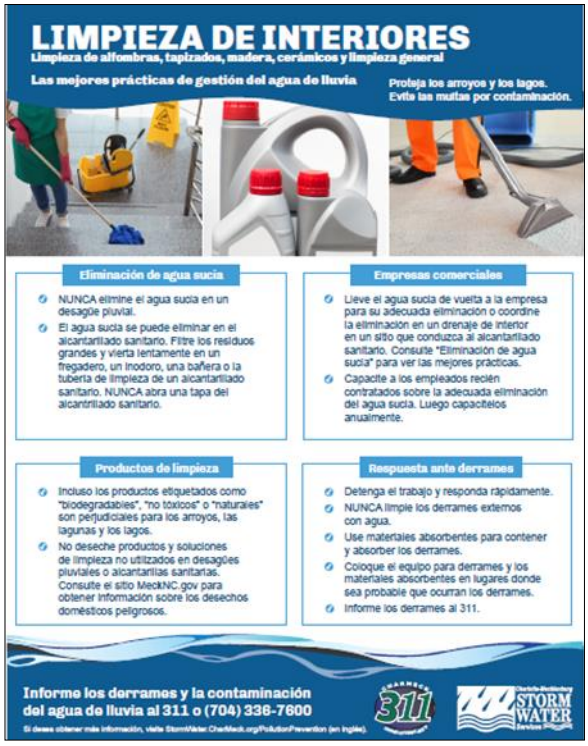


Figure 5-14: Cleaning industry flyer

Table 5-12: Commercial Sector Education Program Results

Activity	Results
Indoor cleaning industry brochures mailed	213
Pool and spa maintenance brochures mailed	91

Swimming Pools and Spas: CMSWS updated the Pool and Spa Maintenance flyer (**Figure 5-15**) and translated it into Spanish. Several social media posts were also done focusing on pool discharges and BMPs. City staff worked with Mecklenburg County to send a letter and the updated flyer to Spa and Maintenance businesses throughout the Charlotte and Mecklenburg County region. The letter notified recipients about both the City and County Stormwater Pollution Control Ordinances and that disposing of chlorinated pool or spa water is an illicit discharge. A utility bill insert focusing on pool discharges was planned for the Spring but was cancelled to focus on COVID-related messages. **Table 5-12** shows the data relative to this program for the report period.

Figure 5-15: Pool and spa flyer

5.7 Service Requests and Documentation

The 311-call center refers calls for stormwater general, structural, and flooding concerns to GSD-SWS while surface water quality (SWQ) concerns are referred to CMSWS. Responding to SWQ service requests continues to be one of the most important methods for detecting and eliminating illicit discharges and connections in the City. This includes response to emergency situations that typically involve oil, fuel, or other hazardous material releases, as discussed further in sub-section 8.5. All service requests and emergencies are investigated, and follow-up is provided to ensure efforts are taken to remediate the discharge and restore impacted areas. Enforcement activities are implemented as appropriate and are described in more detail in sub-section 5.2 while **Table 3-5** provides further breakdown of the caller type and corresponding number of service requests. **Table 5-12** shows the data relative to this program for the report period.

Table 5-12: Service Request Program Results

Activity	Results
Total stormwater service requests received	9,104
SWQ service requests (pollution related)	605
SWQ emergency responses	48

The City utilizes the Cityworks® database platform to maintain electronic files documenting all IDDE activities including service requests. These are tracked from the original call for service, through investigations and applicable enforcement actions, and until final remedial work is completed.

The database stores information such as reporting party contact information, date, time, investigator information, pollutant category, investigation reports, monitoring data, photos and attachments, applicable enforcement information, and geo-location.

During the report period the following watershed areas recorded the highest number of activities including service requests, emergency responses, and NOVs:

- Little Sugar Creek;
- Briar Creek;
- Irwin Creek; and
- McMullen Creek.

Figure 5-16 shows a summary report of a service request activity, and **Figure 5-17** shows the report period spatial distribution of service requests within the City.

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FIGURE 5-16

Charlotte-Mecklenburg STORM WATER Services

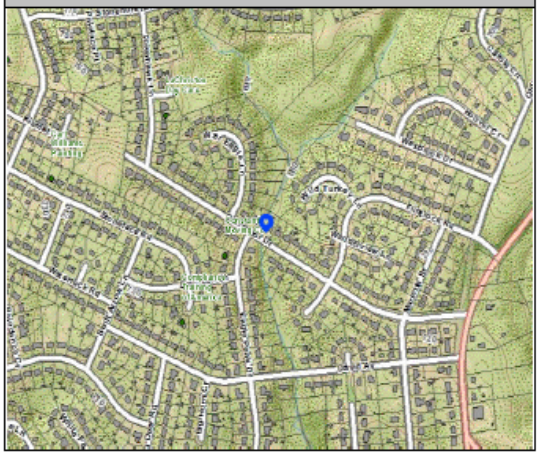
2145 Suttle Avenue
Charlotte, NC 28208-5237

Service Request Report

General Information

Request ID: 20803
Status: CLOSED
Emergency: No
Initial Call: 9/27/2017 6:27:00PM
Initiated By: EMERALD, SYSTEM
Date/Time Init: 9/27/2017 6:27:00PM
Submit To: EDWARDS, OLIVIA
Dispatch To: Besier, Timothy
Closed By: EDWARDS, OLIVIA
Date Closed: 10/6/2017 3:20:30PM
Closed in 9 days

Problem Location



Caller Information

Caller: ALEXIS RIDDLE
Address: 6746 GLENMOOR DR
Phone Number:
Customer Notified: Yes

Incident Information

Address: 6746 GLENMOOR DR Charlotte - (Paw Creek)
Type: General Water Quality Service Request
Problems Found: 1 - **Resolved:** 1
Details: CLR SAYS CREEK BESIDE HER HOUSE IS BROWN WITH FOAM AND SMELLS LIKE SEWAGE

Inspections Summary

Insp. ID:	Insp. Type:	Insp. Date:	Customer:	Inspector:	Attachments
32942	General Inspection	9/28/2017 9:00:00AM	Phase1	Besier, Timothy	3

Incident type	Discharge/dump	
Media impacted	Stream	
Material released	Sewage - CMU	
Investigation methods used	Physical	
Amount spilled	Gallons	2,400
Land use type for activity location	Single-family residential	

Summary: Mr. Timothy Besier of Charlotte-Mecklenburg Storm Water Services (CMSWS) arrived at the site at approximately 9:00 AM on September 28, 2017 to investigate a potential sewage release into a tributary of Paw Creek. Upon arrival to the site, Mr. Besier observed a strong sewage odor coming from the tributary to Paw Creek at Glenmoor Drive. The creek also appeared cloudy and grayish-brown in color. Mr. Besier tracked the odor and discoloration upstream to a sanitary sewer manhole located behind the residence addressed as 6508 War Eagle Lane. Mr. Besier observed sewage discharging from the manhole (presumably due to a blockage in the line) and entering the tributary to Paw Creek. Mr. Besier immediately contacted Mr. Steve Wrobleski, Utilities Scheduler Planner with the City of Charlotte, via telephone to notify him of the sewer overflow. Mr. Wrobleski indicated he would dispatch a rapid response team to remove the sewer line blockage immediately.

CHARLOTTE.

To report pollution or drainage problems call: 311
http://stormwater.charmeck.org

9/6/2018 6:13:28PM

Page 1 of 2

Insp. ID:	Insp. Type:	Insp. Date:	Customer:	Inspector:	Attachments
32951	General Inspection	9/28/2017 3:40:58PM	Phase1	Besier, Timothy	3

Incident type	Discharge/dump	
Media impacted	Stream	
Material released	Sewage - CMU	
Investigation methods used	Physical	
Amount spilled	Gallons	2,400
Land use type for activity location	Single-family residential	

Summary: Mr. Besier returned to the site at approximately 3:40 PM on September 28, 2017 to perform a follow-up inspection of the incident. Mr. Besier inspected the affected sanitary sewer manhole and confirmed that the blockage had been removed from the line, as sewage was no longer discharging from the manhole. The tributary to Paw Creek still appeared discolored and odorous downstream of the release due to the presence of residual sewage. Mr. Besier contacted Mr. Wrobleski again on September 29, 2017 and requested that he send out a crew to flush the creek with potable water in order to dilute the sewage impact. Mr. Wrobleski indicated that the creek would be flushed with potable water that same day.

Insp. ID:	Insp. Type:	Insp. Date:	Customer:	Inspector:	Attachments
33016	General Inspection	10/2/2017 4:00:00PM	Phase1	Besier, Timothy	4

Incident type	Discharge/dump	
Media impacted	Stream	
Material released	Sewage - CMU	
Investigation methods used	Physical	
Amount spilled	Gallons	2,400
Land use type for activity location	Single-family residential	

Summary: Mr. Besier performed a final follow-up inspection of the incident on October 2, 2017 following flushing of the impacted creek with potable water. Upon arrival to the site, Mr. Besier inspected the tributary to Paw Creek adjacent to 6746 Glenmoor Drive. The creek appeared clear with no visible or olfactory evidence of impact. Mr. Besier then walked upstream to the release location to look for other signs of sewage impact. A faint sewage odor and a very small amount of sewer fungus was identified immediately downstream of the release location. Overall, however, the creek appeared clear and free of significant impact. Mr. Besier utilized a YSI ProDSS multi-parameter probe to collect water quality measurements immediately downstream of the release location in a free-flowing portion of the creek. Although the measured dissolved oxygen (DO) concentration was slightly lower than expected, all other parameters, including specific conductivity, were within acceptable ranges. The slightly depressed DO concentration that was observed is likely due to low flow conditions and/or continued aerobic degradation of residual organic matter associated with the release. DO concentrations are expected to increase as flow increases and residual organic matter is further degraded and diluted. No further action is recommended for CMSWS, as the release has ceased and residual impact within the creek has been diluted to acceptable levels.

FIGURE 5-17

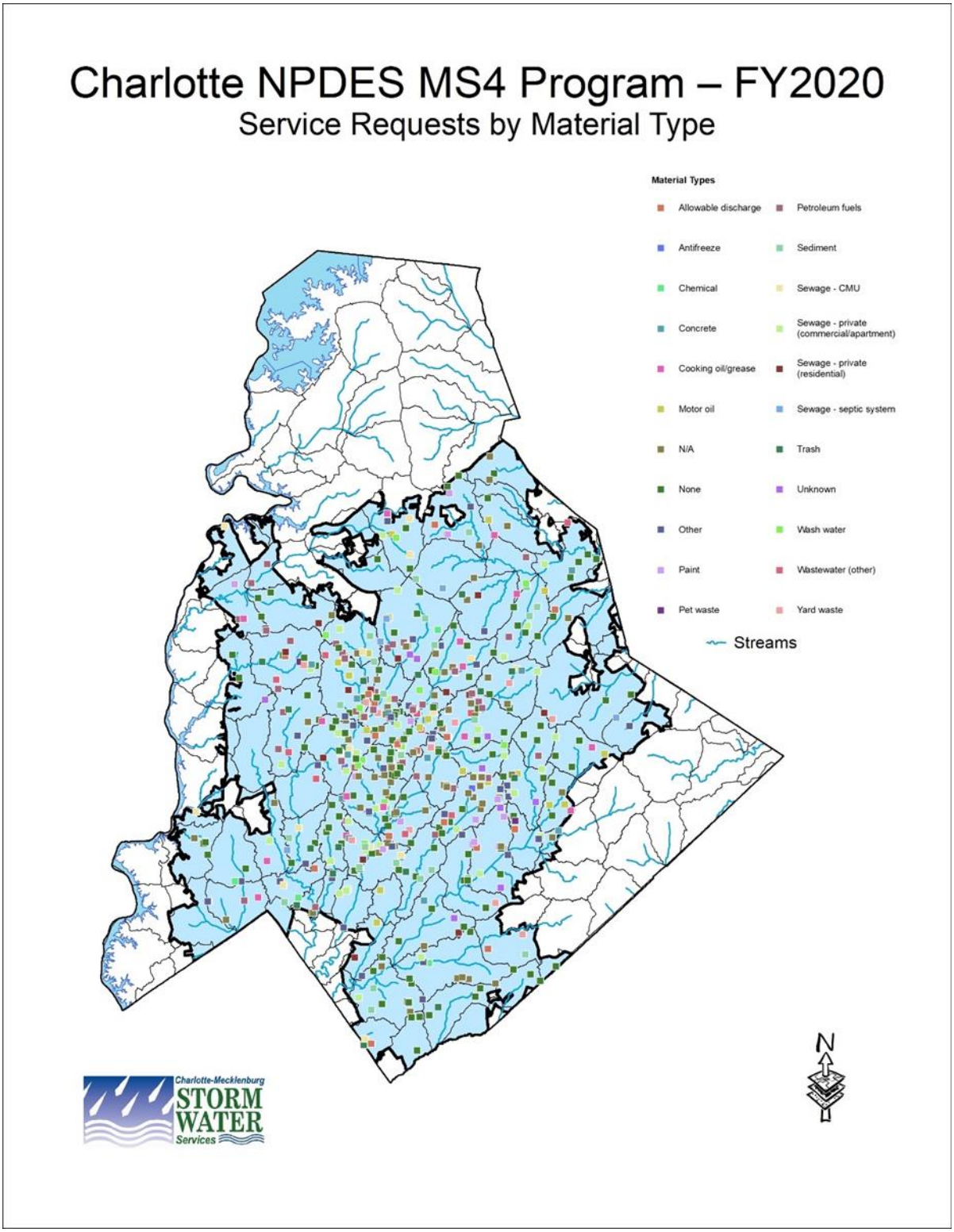

Charlotte NPDES MS4 Program – FY2020
Service Requests by Material Type
Material Types
Allowable discharge
Antifreeze
Chemical
Concrete
Cooking oil/grease
Motor oil
N/A
None
Other
Paint
Pet waste
Petroleum fuels
Sediment
Sewage - CMU
Sewage - private (commercial/apartment)
Sewage - private (residential)
Sewage - septic system
Trash
Unknown
Wash water
Wastewater (other)
Yard waste
Streams
N
Charlotte-Mecklenburg
STORM WATER
Services

Figure 5-18 shows a downward trend in the number of emergency response calls from FY1995 through FY2020, while **Figure 5-19** shows the locations of the emergency response calls.

FIGURE 5-18

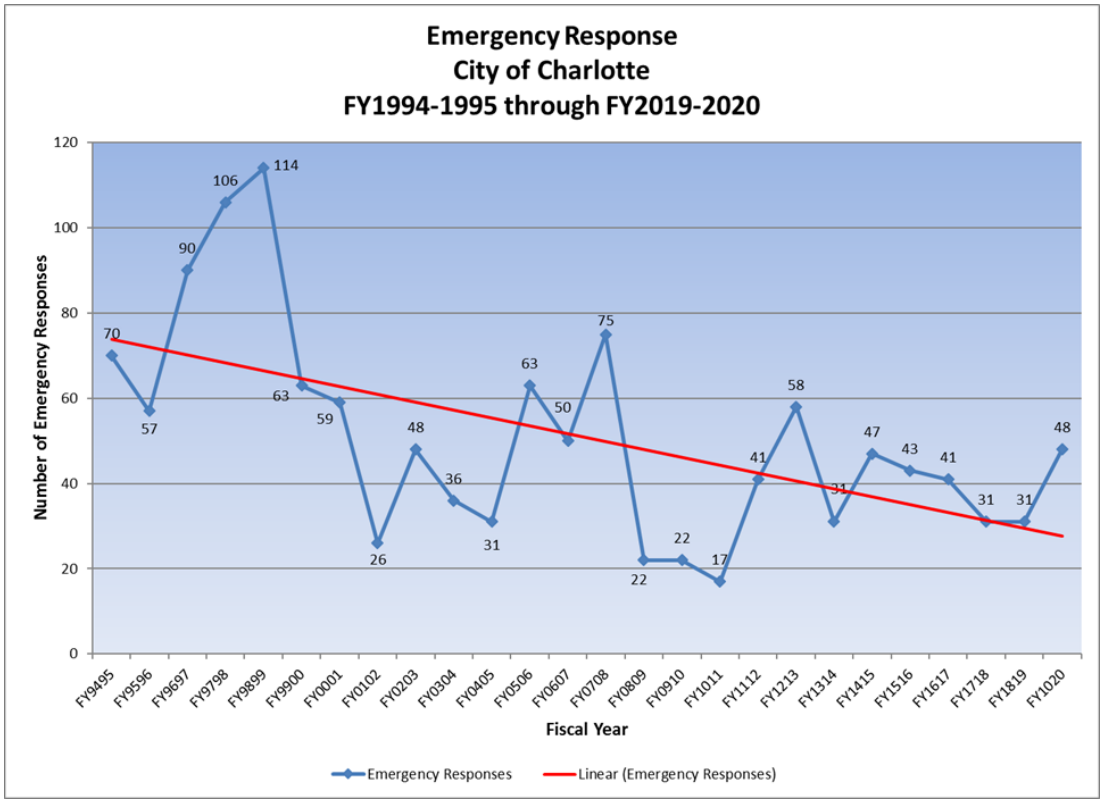


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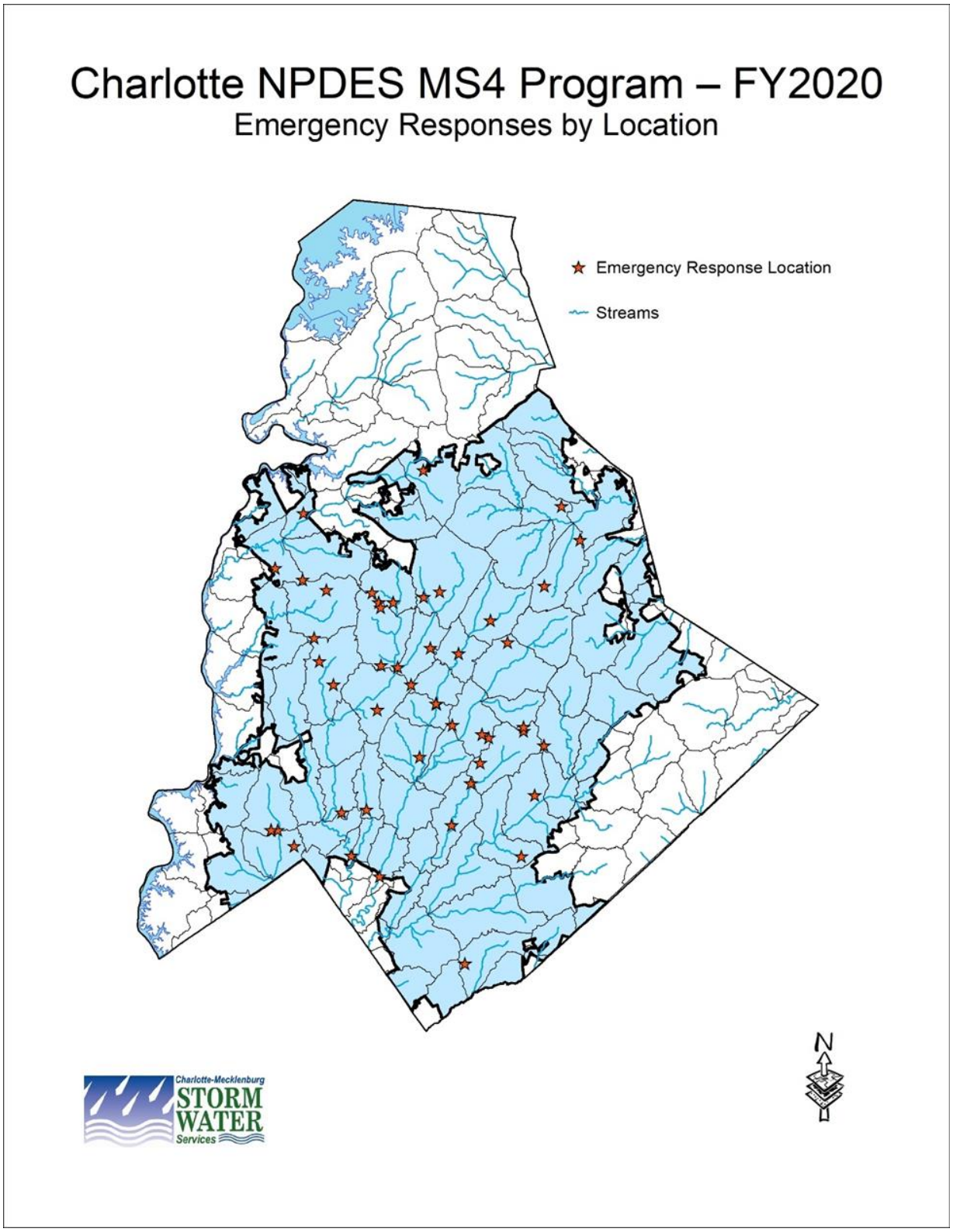
FIGURE 5-19


Charlotte NPDES MS4 Program – FY2020
Emergency Responses by Location
Emergency Response Location
Streams
N
Charlotte-Mecklenburg
STORM
WATER
Services

5.8 Measurable Goals/Planned Activities for Future Program Years

Table 5-14 describes the various Illicit Discharge Detection and Elimination program BMPs and the Measurable Goals and Planned Activities for Future Program Years for each BMP by permit term year.

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Table 5-14: BMP Measurable Goals for the Illicit Discharge Detection and Elimination Program.

BMP	BMP Description	Measurable Goals (by permit term year)				
		1	2	3	4	5+
Maintain appropriate legal authorities	Maintain adequate ordinances or other legal authorities to prohibit illicit connections and discharges and enforce the approved IDDE Program.	Continue administration and enforcement of the Pollution Control Ordinance and IDDE Program. (On-going, years 1 – 5+)				
Maintain a Storm Sewer System Base Map	The permittee shall maintain a current map showing major outfalls and receiving streams.	Continue to maintain storm sewer map in GIS and update as necessary to show additional outfalls. (On-going, years 1 – 5+)				
Inspection / detection program to detect dry weather flows at MS4 outfalls	Maintain written procedures and/or Standard Operating Procedures (SOPs) for detecting and tracing the sources of illicit discharges and for removing the sources or reporting the sources to the State to be properly permitted. Written procedures and/or SOPs shall specify a timeframe for monitoring and how many outfalls and the areas that are to be targeted for inspections.	Maintain and update SOPs for detecting and eliminating illicit discharges and performing outfall inspections. Roughly 20% of identified outfalls will be inspected each year, with extra emphasis on hotspot areas. (On-going, years 1 – 5+)				
Employee Training	Conduct training for appropriate municipal staff on detecting and reporting illicit connections and discharges.	Maintain an employee training program and conduct employee training. (On-going, years 1 – 5+)				
Maintain a public reporting mechanism	Maintain and publicize reporting mechanism for the public to report illicit connections and discharges. Establish citizen request response procedures.	Maintain the public reporting hotline and publicize through the media outreach campaign. (On-going, years 1 – 5+)				
Documentation	The permittee shall document the date of investigations, any enforcement action(s) or remediation that occurred.	Continue to maintain IDDE program records and databases to accurately document the activities in the program. (On-going, years 1 – 5+)				

5.9 Program Assessment

The overall Illicit Discharge Detection and Elimination Program was successfully implemented during the annual report period. **Table 5-15** shows a summary of the various items and corresponding data results for activities conducted under the program.

Table 5-15: Program Summary

IDDE PROGRAM	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024
SWPCO NOVs issued	125	124				
SWPCO civil penalties issued	11	13				
Stream miles assessed	218	196				
Outfalls inspected	1,237	802				
Illicit discharges detected/corrected	371	336				
SWQ Service requests/reported problems	553	605				
Municipal employee IDDE training sessions	86	54				
Municipal employees trained on IDDE	1,993	1,692				

The adoption of revisions to the Stormwater Pollution Control Ordinance by City Council was a culmination of much work and analysis, resulting in an even more effective set of regulations to prevent, control, and remediate illicit discharges. The new ordinance became effective at the beginning of FY2021 (July 1, 2020). Follow-up work in FY2021 will include updating of the enforcement procedures based on revisions to the ordinance as well as additional education and outreach to parties affected by the prohibition of pavement sealants with high PAH content.

Continuing with our successful approach at targeting two main commercial sectors for education with the goal of preventing illicit discharges, FY2021 will focus on the boring/drilling and parking lot cleaning sectors. Data analysis, observations, and conversations with people in those business sectors revealed that more education and outreach to them is warranted. It is important to note that staff will continue to provide education and outreach to many other business sectors using developed resources and materials.

A new program implemented as part of the IDEP effort was re-inspecting businesses/locations which received a civil penalty or similar enforcement in the past three years. Eighteen sites were re-inspected in FY2020, but no illicit discharges or problems were identified. Even so, staff feel that it is an important program to continue as an effort to prevent or determine repeated non-compliance.

Additional IDDE program evaluation also resulted in the following conclusions:

- GIS analysis of illicit discharges continues to show that most of these occur in highly urbanized areas of the City. As such, the IDEP program will continue to be implemented as support for the stream walk program in priority basins;
- Targeting multi-family residential communities with education and inspections will continue as these communities are a significant source of SSOs. CMSWS and CW will

continue to coordinate their efforts with each other and the State to improve effectiveness of the program;
- The public and internal staff continue to be the number one source of illicit discharge reporting. The public reporting hotline, public education campaigns, internal education and service request response will continue to be a staple for IDDE efforts;
- The Cityworks® database and use of smart phones for field data entry continues to facilitate data entry, storage and query capabilities; and
- The City's vast and varied surface and stormwater monitoring program continues to be an important resource for detecting illicit discharges and understanding long term trends in water quality.

Section 6: Construction Site Stormwater Runoff Control Program

During the annual report period, the Construction Site Stormwater Runoff Control program conducted site evaluations and enforced the local ordinance per the SWMP. The following sub-sections explain:

- The BMPs implemented to meet program requirements;
- Measures of success;
- Future goals and planned activities; and
- Program assessment.

6.1 BMP Summary Table

Table 6-1 provides information concerning the BMPs implemented to fulfill the requirements of the Construction Site Stormwater Runoff Control Program. Funding for the BMPs in this section is covered by local land development fees.

Table 6-1: BMP Summary Table for the Construction Site Stormwater Runoff Control Program.

BMP	BMP Description	Schedule (years)					Responsible Position
		1	2	3	4	5	
Erosion and Sediment Control Program	The permittee has a delegated Sediment and Erosion Control Program. As such, to the extent authorized by law, the permittee is responsible for compliance with the Sediment Pollution Control Act of 1973 and Chapter 4 of Title 15A of the North Carolina Administrative Code. The delegated Sediment and Erosion Control Program effectively meets the maximum extent practicable (MEP) standard for Construction Site Runoff Controls by permitting and controlling development activities disturbing one or more acres of land surface and those activities less than one acre that are part of a larger common plan of development as authorized under the Sediment Pollution Control Act of 1973 and Chapter 4 of	X	X	X	X	X	Land Development Division Manager

	Title 15A of the North Carolina Administrative Code.						
Develop requirements for construction site operators	The NCG010000 permit establishes requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality, as part of the Permittee's delegated program.	X	X	X	X	X	Land Development Division Manager
Public information and reporting	The permittee shall provide and promote a means for the public to notify the appropriate authorities of observed erosion and sedimentation problems. The permittee may implement a plan promoting the existence of the NCDEQ, Division of Land Resources "Stop Mud" hotline to meet the requirements of this paragraph.	X	X	X	X	X	Land Development Division Manager
Plan reviews	Implement construction site plan reviews as part of the Permittee's delegated program. For new development and redevelopment projects to be built within the permittee's planning jurisdiction by entities with eminent domain authority, the permittee shall, to the maximum extent practicable, coordinate the approval of the construction site runoff control with the Division of Land Resources of NCDEQ.	X	X	X	X	X	Land Development Division Manager

6.2 Erosion and Sediment Control Program

The City has operated a soil erosion and sediment control program locally since 1983, which is currently a delegated Sediment and Erosion Control Program under authority granted by the North Carolina Sedimentation Commission. As such, to the extent authorized by law, the City is responsible for compliance with the Sediment Pollution Control Act of 1973 and Chapter 4 of Title 15A of the North Carolina Administrative Code. The program serves to provide added protection to surface water resources in the City by ensuring that builders and developers follow minimum standards for erosion and sediment control per State and local guidelines.

The "City of Charlotte – Soil Erosion and Sedimentation Control Ordinance (SESCO)," amended and adopted by City Council in 2008, serves as the backbone of the program. Ordinance highlights include the following requirements:

- Review and approval of a soil erosion and sediment control plan for all qualifying land disturbances of one acre or greater;
- An on-site preconstruction conference prior to the installation of any measures or commencement of land disturbing activities;
- Issuance of a grading permit prior to the commencement of land disturbing activities;
- Weekly inspections at a minimum by the permit holder of erosion control measures depending on sensitivity of receiving waters;
- Inspections by the permit holder of measures after any rainfall event totaling one-half inch or greater;

- Documentation and maintenance of inspection records performed by the permit holder;
- Maintenance and optimal performance of all measures for the life of the project performed by the permit holder;
- Requirements for controls to minimize erosion and prevent offsite sedimentation; and
- Enhanced local erosion control requirements which are deemed essential for protecting sensitive environmental features are maintained based on years of field experience and observations.

The ordinance also provides GSD-LD staff with the following:

- Authority to issue NOVs for practices and/or impacts contravening ordinance requirements; and
- Authority to issue civil penalties for violations of the Soil Erosion & Sedimentation Control Ordinance.

Table 6-4 shows the data relative to this program for the report period.

6.2.1 Inspection Procedures

All construction sites that require a preconstruction meeting and an approved plan are logged, filed and placed in the queue for regular inspections. Staff goals are to visit and inspect every logged site utilizing a scheduled inspection process. Sites that generated citizen complaints, had a history of non-compliance, or are in close proximity to a critical area (e.g., sites adjacent to water features or within a water-supply watershed) are considered a priority for additional inspections and follow-up. **Table 6-4** shows the data relative to this program for the report period.

6.3 Construction Site Requirements

The program requires that all land disturbing activities comply with ordinance requirements for controlling erosion and sediment on site. As an additional requirement, and in compliance with NPDES regulations, all construction sites one acre or greater must have an approved soil erosion and sediment control plan designed specifically for the site as required by NPDES General Permit NCG010000 for Construction Related Activities. After plan approval, responsible parties are required to follow the approved plan for all phases of construction, as well as maintain measures in a state that ensures optimal performance throughout the duration of construction activities and until final site stabilization is achieved. Regular self-inspections are a requirement for optimal performance and all sites are required to employ a competent person to conduct inspections and maintain logbooks and documentation for ready-review by local or state representatives.

6.4 Public Information and Reporting

The City's Erosion Control Program maintains a website to assist with the dissemination of information to the development community and the public. In addition, the City, in cooperation

with Mecklenburg County, operates a joint customer service hotline to receive information about a variety of concerns. Citizens can call 311 to report pollution, flooding, and blockages to the drainage system as well as request other City/County services. The 311-call center is staffed to receive calls Monday through Friday from 7 am to 7 pm. Citizens can also submit requests for service to 311 at any time by using the CLT+ app or by going online. The hotline serves as a clearinghouse for general information and ensures that erosion control related issues are directed to appropriate GSD-LD staff for resolution. Information sharing and inter-department training between City and County agencies also ensures that problems, questions, or requests for information from the public can be processed and resolved quickly. The City's erosion control webpage can be viewed at: http://charlottenc.gov/ld/Pages/default.aspx

Table 6-4 shows the data relative to this program for the report period.

6.4.1 Education and Training Materials

The City maintains an education and training program for developers, contractors and other interested parties within the region. Although program policies and procedures dictated that self-inspectors maintain a level of competence necessary to ensure compliance, the City takes a proactive role by providing local training and handout materials for affected parties.

In a cooperative effort with Mecklenburg County, the City maintains the Charlotte-Mecklenburg Certified Site Inspector ("CMCSI") training program, which has provided training to many individuals since its inception in 2003. CMCSI is a full day training course that provides attendees with an understanding of the importance of water resources to our community, the local and state requirements for controlling construction site runoff, principles of erosion control, common site problems, recommendations for conducting effective inspections, and a certification exam. The CMCSI program is offered two to three times per year in classroom sessions as well as being offered as an online option throughout the year for renewal/recertification purposes. Due to the 2020 COVID-19 pandemic, the training was adapted and offered online which could be taken at any time. **Table 6-2** shows the data relative to this program for the report period.

In addition to the CMCSI education program, all developers, builders and responsible parties receive handouts and materials at preconstruction meetings and at other times as necessary to explain ordinance requirements, minimum standards and other relevant information for the financially responsible party and/or site operators.

Table 6-2: CMCSI Training Program Results

Activity	Results
Cumulative total persons trained since program inception (FY2003)	6,474
Training sessions conducted	2
Total persons trained	339
Persons attending training sessions	294
Persons trained on-line	45

6.5 Plan Reviews

All land disturbing activities one acre or greater are required to obtain plan approval of the soil erosion and sediment control plan prior to scheduling a preconstruction conference. Erosion control plans submitted by the applicants are reviewed and approved by GSD-LD erosion control staff.

All GSD-LD erosion control staff obtain and maintain their status as a Certified Professional in Erosion and Sediment Control (CPESC) which provides accreditation for plan review. Plans are reviewed for suitability of selected measures and to ensure that design parameters and calculations are appropriately utilized and minimum standards are achieved.

6.6 Measurable Goals/Planned Activities for Future Program Years

Table 6-3 describes the various Construction Site Stormwater Runoff Control BMPs and the Measurable Goals and Planned Activities for Future Program Years for each BMP by permit term year.

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Table 6-3: BMP Measurable Goals for the Construction Site Stormwater Runoff Control Program.

BMP	BMP Description	Measurable Goals (by permit term year)				
		1	2	3	4	5+
Erosion and Sediment Control Program	The permittee has a delegated Sediment and Erosion Control Program. As such, to the extent authorized by law, the permittee is responsible for compliance with the Sediment Pollution Control Act of 1973 and Chapter 4 of Title 15A of the North Carolina Administrative Code. The delegated Sediment and Erosion Control Program effectively meets the maximum extent practicable (MEP) standard for Construction Site Runoff Controls by permitting and controlling development activities disturbing one or more acres of land surface and those activities less than one acre that are part of a larger common plan of development as authorized under the Sediment Pollution Control Act of 1973 and Chapter 4 of Title 15A of the North Carolina Administrative Code.	Continue to implement the delegated Sediment and Erosion Control program and enforce the City ordinance. (On-going, years 1 – 5+)				
Develop requirements for construction site operators	The NCG010000 permit establishes requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality, as part of the Permittee's delegated program.	Continue requirements for BMPs and waste control through issuance of General Construction Permit NCG010000. (On-going, years 1 – 5+)				
Public information and reporting	The permittee shall provide and promote a means for the public to notify the appropriate authorities of observed erosion and sedimentation problems. The permittee may implement a plan promoting the existence of the NCDENR, now NCDEQ, Division of Land Resources "Stop Mud" hotline to meet the requirements of this paragraph.	Continue to maintain reporting hotline and website. (On-going, years 1 – 5+)				
Plan reviews	Implement construction site plan reviews as part of the Permittee's delegated program. For new development and redevelopment projects to be built within the permittee's planning jurisdiction by entities with eminent domain authority, the permittee shall, to the maximum extent practicable, coordinate the approval of the construction site runoff control with the Division of Land Resources of DENR.	Continue plan reviews to ensure program requirements are met. Coordinate with NCDEQ-Division of Energy, Mining, and Land Resources as necessary. (On-going, years 1 – 5+)				

6.7 Program Assessment

The overall Construction Site Stormwater Runoff Control Program was successfully implemented during the annual report period. **Table 6-4** shows a summary of the various items and corresponding data results for activities conducted under the program.

Table 6-4: Program Summary

CONSTRUCTION SITE RUNOFF PROGRAM	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024
SESCO NOVs issued	51	41				
SESCO civil penalties issued	60	31				
Site inspections conducted	3,513	4,902				
Service requests/reported problems	500	550				
CMCSI training sessions	3	2				
Persons trained on CMCSI	349	339				
Project/site plans reviewed	1,254	1,030				

The City of Charlotte's delegated Construction Site Stormwater Runoff Control program has been in place since 1983. With improvements in strategy and effectiveness over time coupled with many years of staff experience, the program continues to operate very well. There was a significant increase in site inspections from FY2019 to FY2020, partly due to even more development in Charlotte but also because more citizens are reporting issues. This is likely due to several factors including increased development, increased population, public education and outreach efforts, and more options available for citizen reporting (311 hotline, website, phone app). While there were more inspections compared to FY2019, there were fewer NOVs and civil penalties. One primary reason for that is that many of the citizen-reported issues tend to be at single-family, infill development properties with small issues that are relatively simple to fix compared to much larger, permitted developments.

Section 7: Post-Construction Stormwater Management Program

During the annual report period, the City conducted implementation of its Post-Construction Stormwater Management program in accordance with the Post-Construction Stormwater Ordinance ("PCSO") and program administrative manual. The following sub-sections explain:

- The BMPs implemented to meet program requirements;
- Measures of success;
- Future goals and planned activities; and
- Program assessment.

7.1 BMP Summary Table

Table 7-1 provides information concerning the BMPs implemented to fulfill the requirements of the Post-Construction Stormwater Management Program. Funding for the BMPs in this section is covered by local stormwater utility fees and land development fees.

Table 7-1: BMP Summary Table for the Post-Construction Stormwater Management Program.

BMP	BMP Description	Schedule (years)					Responsible Position
		1	2	3	4	5	
Post-Construction Stormwater Management Program	Maintain an ordinance (or similar regulatory mechanism) and program to address stormwater runoff from new development and redevelopment.	X	X	X	X	X	Water Quality Program Manager
Strategies which include BMPs appropriate for the MS4	Maintain strategies that include a combination of structural and/or non-structural BMPs implemented in concurrence with ordinance above. Provide a mechanism to require long-term operation and maintenance of structural BMPs. Require annual inspection reports of permitted structural BMPs performed by a qualified professional. A qualified professional means an individual trained and/or certified in the design, operation, inspection and maintenance aspects of the BMPs being inspected, for example, someone trained and certified by NC State for BMP Inspection & Maintenance.	X	X	X	X	X	Water Quality Program Manager
Deed Restrictions and Protective Covenants	The permittee shall provide mechanisms such as recorded deed restrictions and protective covenants so that development activities maintain the project consistent with approved plans.	X	X	X	X	X	Water Quality Program Manager
Operation and Maintenance Plan	The developer shall provide the permittee with an operation and maintenance plan for the stormwater system, indicating the operation and maintenance actions that shall be taken, specific quantitative criteria used for determining when those actions shall be taken, and who is responsible for those actions. The plan must clearly indicate the steps that shall be taken and who shall be responsible for restoring a stormwater system to design specifications if a failure occurs and must include an acknowledgment by the responsible party. Development must be maintained consistent with the requirements in the approved plans and any modifications to those plans must be approved by the Permittee.	X	X	X	X	X	Water Quality Program Manager
Educational materials and training for developers	Provide educational materials and training for developers. New materials may be developed by the permittee, or the permittee may use materials adopted from other programs and adapted to the	X	X	X	X	X	Water Quality Program Manager

	permittee's new development and redevelopment program.						

7.2 Post-Construction Stormwater Management Program

The City's post-construction program is designed to meet the stormwater management and surface water quality protection requirements of North Carolina Administrative Code at 15A 02H Sections .0126, .0150 - .0154 (NPDES) and at 15A 02H Section .1000 (Stormwater Management) to address post-construction stormwater runoff from new development and applicable redevelopment projects as required by the NPDES MS4 permit program and as allowable under current State law. The City PCSO covers the entire jurisdictional area (incorporated and ETJ areas) of the City and includes provisions for enforcement remedies and civil penalties to ensure compliance. An administrative manual is maintained to ensure successful implementation of the program and ordinance. **Table 7-3** shows the data relative to this program for the report period.

7.3 Post-Construction BMP Strategies

BMP strategies for the City's Post-Construction Stormwater Management program consist mainly of structural stormwater control measure(s) ("SCMs") such as sand filters, wet ponds, wetlands, and bioretention areas. SCMs and design procedures are detailed in a local manual developed by the City and County. SCMs are required on projects that have 24% or greater built upon area as defined by the program. This threshold is reduced to 10-12% built upon area for developments disturbing more than an acre and/or adding more than 20,000 sf of built upon area in sensitive watersheds as defined by the ordinance. In addition, SCMs must be designed to:

- Remove 85% of Total Suspended Solids ("TSS") for the runoff volume generated from the first 1-inch of rainfall;
- Control the runoff volume from the 1-year – 24-hour storm event; and
- Control the peak flow from the 10 and 25-year storm events for residential and commercial development.

The program also requires proper operation, maintenance, and inspection of SCMs as discussed in later sub-sections. Green infrastructure practices such as rain gardens, pervious pavements, vegetated conveyances, and rain water harvesting are allowed, depending on development needs. Undisturbed natural areas and natural resource protection as well as tree preservation requirements are part of the program. Additional requirements include:

- 70% Total Phosphorus removal in certain watersheds;
- Various buffer requirements and widths from 30 – 200 feet based on stream jurisdictional determination; and
- Design standards depending on watershed location and sensitivity.

All of these requirements combine to make a much more sound and protective ordinance and program than is required by State law. **Table 7-3** shows the data relative to this program for the report period.

7.4 Deed Restrictions and Protective Covenants

As part of the PCSO program, the City requires deed restrictions and protective covenants to ensure that development projects remain consistent with approved plans. Stream and buffer boundaries are required to be specified on all surveys and record plats. An operation and maintenance agreement for SCMs is required to be referenced on record plats and recorded in deeds. In addition, a maintenance easement is required to be recorded to provide access to structural SCMs.

7.4.1 Setbacks for Built-Upon Areas

The PCSO program requires a minimum of 30-foot buffers on all perennial and intermittent streams draining less than 50 acres, and incrementally increased required buffer widths up to 100-feet for streams draining 640 acres or more. A special provision in the program requires 200-foot buffers on all perennial streams and 100-foot buffers on all intermittent streams in the Six Mile Creek watershed due to the potential presence of the federally endangered species, Carolina Heelsplitter (*Lasmigona decorata*). These buffers are recorded on record plats as noted in sub-section 7.4.

7.5 Operation and Maintenance Plan

The PCSO program requires an operation and maintenance agreement executed by the responsible party (owner) of each stormwater control measure (SCM). As part of the program, the owner is required to:

- Conduct annual inspections of SCMs;
- Maintain proper records documenting operation and maintenance activities; and
- Submit inspection reports to the City.

In the case of single-family residential projects, at the request of the homeowner's association the City may assume the responsibility for operating, maintaining, and inspecting required SCMs after an initial two-year period for SCMs that are constructed and functioning properly.

CMSWS conducts annual inspections of SCMs to ensure proper operation and maintenance and compliance with the PCSO. **Table 7-3** shows the data relative to this program for the report period.

7.6 Education and Training Program

The City implements an education and training program designed to provide developers, designers, and site owners with the information necessary to comply with the City's Post-Construction Stormwater Ordinance. Training typically includes information on:

- Overall ordinance requirements;
- Review processes;
- Land development and SCM design requirements;
- Deed restrictions and protective covenants;
- Buffer requirements; and
- Operation, maintenance, and inspection requirements for SCMs.

Education and training are accomplished by providing the following:

- Website information;
- Individual meetings with developers and designers;
- Presentations at public meetings;
- Periodic seminars and training sessions; and
- Training City Land Development staff.

Table 7-3 shows the data relative to this program for the report period.

7.7 Measurable Goals/Planned Activities for Future Program Years

Table 7-2 describes the various Post-Construction Stormwater Management Program BMPs and the Measurable Goals and Planned Activities for Future Program Years for each BMP by permit term year.

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Table 7-2: BMP Measurable Goals for the Post-Construction Stormwater Management Program.

BMP	BMP Description	Measurable Goals (by permit term year)				
		1	2	3	4	5+
Post-Construction Stormwater Management Program	Maintain an ordinance (or similar regulatory mechanism) and program to address stormwater runoff from new development and redevelopment.	Maintain the City's Post- Construction Ordinance (PCSO) and implement and enforce the ordinance. (On-going, years 1 – 5+)				
Strategies which include BMPs appropriate for the MS4	Maintain strategies that include a combination of structural and/or non-structural BMPs implemented in concurrence with (a) above. Provide a mechanism to require long-term operation and maintenance of structural BMPs. Require annual inspection reports of permitted structural BMPs performed by a qualified professional. A qualified professional means an individual trained and/or certified in the design, operation, inspection and maintenance aspects of the BMPs being inspected, for example, someone trained and certified by NC State for BMP Inspection & Maintenance.	Continue PCSO program and ensuring proper BMP operation, maintenance, and annual inspections. (On-going, years 1 – 5+)				
Deed Restrictions and Protective Covenants	The permittee shall provide mechanisms such as recorded deed restrictions and protective covenants so that development activities maintain the project consistent with approved plans.	Continue to implement Deed Restrictions and Protective Covenants through administration of the PCSO Program. (On-going, years 1 – 5+)				
Operation and Maintenance Plan	The developer shall provide the permittee with an operation and maintenance plan for the stormwater system, indicating the operation and maintenance actions that shall be taken, specific quantitative criteria used for determining when those actions shall be taken, and who is responsible for those actions. The plan must clearly indicate the steps that shall be taken and who shall be responsible for restoring a stormwater system to design specifications if a failure occurs and must include an acknowledgment by the responsible party. Development must be maintained consistent with the requirements in the approved plans and any modifications to those plans must be approved by the Permittee.	Continue to implement BMP operation, maintenance, and inspection plan and procedures. (On-going, years 1 – 5+)				
Educational materials and training for developers	Provide educational materials and training for developers. New materials may be developed by the permittee, or the permittee may use materials adopted from other programs and adapted to the permittee's new development and redevelopment program.	Continue to provide and update education/ training tools for developers. (On-going, years 1 – 5+)				

7.8 Program Assessment

The overall Post-Construction Stormwater Management Program was successfully implemented during the annual report period. **Table 7-3** shows a summary of the various items and corresponding data results for activities conducted under the program.

Table 7-3: Program Summary

POST-CONSTRUCTION PROGRAM	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024
PCSO NOVs/CARs issued[3.]	380	390				
PCSO civil penalties issued	0	4				
Site plans reviewed	126	157				
SCMs added by development	112	90				
SCM inspections conducted[4.]	1,600	1,600				
PCSO training sessions	1	1				
Persons trained on PCSO[5.]	128	74				

3. Includes NOVs and Corrective Action Requests (CARs); and notice of maintenance and report due letters to remind the property owner that a yearly inspection report is due.

4. Includes Post-Construction and Peak Detention SCMs inspected.

5. Number includes only attendees at workshops. Others were educated about aspects of the Post-Construction program through phone calls, website, and other ways.

Section 8: Pollution Prevention/Good Housekeeping Program

During the annual report period, inspection, training, and program development activities were conducted for municipal facilities and operations as part of the Pollution Prevention and Good Housekeeping Program per the SWMP. The following sub-sections explain:

- The BMPs implemented to meet program requirements;
- Measures of success;
- Future goals and planned activities; and
- Program assessment.

8.1 BMP Summary Table

Table 8-1 provides information concerning the BMPs implemented to fulfill the requirements of the Pollution Prevention & Good Housekeeping Program.

Table 8-1: BMP Summary Table for the Pollution Prevention/Good Housekeeping Program.

BMP	BMP Description	Schedule (years)					Responsible Position
		1	2	3	4	5	
Operation and maintenance program for municipal facilities and	Maintain and implement an operation and maintenance program for municipal facilities owned and operated by the permittee that have been determined by the permittee to have	X	X	X	X	X	Water Quality Program Manager

operations.	significant potential for generating polluted stormwater runoff that has the ultimate goal of preventing or reducing pollutant runoff.						
Site Pollution Prevention Plans for municipal facilities and operations.	Maintain and implement Site Pollution Prevention Plans for municipal facilities owned and operated by the permittee that have been determined by the permittee to have significant potential for generating polluted stormwater runoff that has the ultimate goal of preventing or reducing pollutant runoff.	X	X	X	X	X	Water Quality Program Manager
Inspection and evaluation of municipal facilities and operations.	Maintain an inventory of municipal facilities and operations owned and operated by the permittee that have been determined by the permittee to have significant potential for generating polluted stormwater runoff, including the MS4 system and associated structural SCMs, conduct inspections at facilities and operations owned and operated by the permittee for potential sources of polluted runoff, the stormwater controls, and conveyance systems, and evaluate the sources, document deficiencies, plan corrective actions, implement appropriate controls, and document the accomplishment of corrective actions.	X	X	X	X	X	Water Quality Program Manager
Spill Response Procedures municipal facilities and operations.	Maintain spill response procedures for municipal facilities and operations owned and operated by the permittee that have been determined by the permittee to have significant potential for generating polluted stormwater runoff.	X	X	X	X	X	Water Quality Program Manager
Prevent or Minimize Contamination of Stormwater Runoff from all areas used for Vehicle and Equipment Cleaning	Describe measures that prevent or minimize contamination of the stormwater runoff from all areas used for vehicle and equipment cleaning, including fire stations that serve more than three fire trucks and ambulances. Perform all cleaning operations indoors, cover the cleaning operations, ensure wash water drains to the sanitary sewer system, collect stormwater runoff from the cleaning area and providing treatment or recycling, or other equivalent measures. If sanitary sewer is not available to the facility and cleaning operations take place outdoors, the cleaning operations shall take place on grassed or graveled areas to prevent point source discharges of the wash water into the storm drains or surface waters. Where cleaning operations cannot be performed as described above and when operations are performed in the vicinity of a storm drainage collection system, the drain is to be covered with a portable drain cover during cleaning activities. Any excess standing water shall be removed and properly handled prior to removing the drain cover. Facilities that serve three or fewer fire trucks and ambulances and that cannot comply with these	X	X	X	X	X	Water Quality Program Manager

	requirements shall incorporate structural measures during facility renovation.						
Streets, roads, and public parking lots maintenance	The permittee shall evaluate BMPs to reduce polluted stormwater runoff from municipally-owned streets, roads, and public parking lots within the corporate limits. Within 12 months of permit issuance, the permittee must update its Stormwater Plan to include the BMPs selected.	X					Water Quality Program Manager
Streets, roads, and public parking lots maintenance	Within 24 months of permit issuance, the permittee must implement BMPs selected to reduce polluted stormwater runoff from municipally-owned streets, roads, and public parking lots identified by the permittee in the Stormwater Plan.		X	X	X	X	Water Quality Program Manager
Operation and Maintenance (O&M) for municipally-owned or maintained structural SCMs and the storm sewer system (including catch basins, the conveyance system, and structural stormwater controls).	Within 12 months of permit issuance, the permittee shall develop and implement an operation and maintenance program for structural SCMs and the storm sewer system (including catch basins, the conveyance system, and structural stormwater controls).	X	X	X	X	X	Water Quality Program Manager
Staff training	Maintain and implement a training plan that indicates when, how often, who is required to be trained and what they are to be trained on.	X	X	X	X	X	Water Quality Program Manager

8.2 Operation and Maintenance Program

The City continues to provide an extensive network of municipal operations designed to serve its citizens and keep vital infrastructure functioning properly. A number of these operations impact the storm drainage system directly, such as storm drainage system maintenance and street sweeping, and indirectly, such as landscape management and municipal building maintenance. The cumulative impact of all these operations can potentially be significant, so it is important to maintain operation and maintenance programs to minimize impacts to the storm drainage system.

Operation and maintenance of municipal facilities is managed through implementation of Stormwater Pollution Prevention Plan(s) ("SWPPPs") and the municipal facility inspection program. Those programs are discussed below in sub-sections 8.3, 8.4, 8.5 and 8.9. Operation and maintenance of the municipal stormwater system is discussed separately in sub-section 8.8.

GSD-SWS staff continue to work with various departments to improve and refine best management practices to minimize negative impacts to the storm drainage system. This is primarily accomplished through observations in the field and response to reports from concerned residents and internal staff about field operation practices where improvements are needed. CMSWS staff then work with staff from various departments to refine established BMPs for field operations and/or establish new BMPs. Implementation of BMPs then occurs through a

combination of communications with management, training of field operations staff, and revision of contract requirements.

GSD-SWS staff also accomplishes activities related to improving pollution prevention from City contractors and City field crews, as follows:

- Working with GSD-SWS construction staff, land development erosion control staff, and CW Engineering to share resources, coordinate efforts, and develop the best procedures and methods for improving contractor and subcontractor performance related to soil erosion and sediment control;
- Continuing to support the use of a "Surface Water Quality Protection" clause for GSD-SWS construction contracts that include requirements related to:
  - Concrete washouts;
  - Spill response and mobile fueling; and
  - Erosion control and pollution prevention before street flushing.
- Continuing discussions with Charlotte Department of Transportation ("CDOT") and research of stormwater BMPs for street milling;
- Working with GSD-SWS contractors and GSD-SWS construction inspectors to determine standards for power washing water from spin casting;
- Continuing communications and meetings with CW regarding stormwater BMPs for sediment-laden water created during water main break repairs;
- Continuing communications with City Solid Waste Services regarding street sweeping discharges;
- Communicating a snow disposal BMP to CDOT before ice and snow events; and
- Continuing discussion with the City's Risk Management Department regarding spill response preparedness.

8.3 Municipal Facility Stormwater Pollution Prevention Plans

SWPPPs are developed for all municipal facilities listed in **Table 8-2** regardless of whether or not they are required; however, SWPPPs are not required or developed for fire stations. The SWPPPs are reviewed and updated annually with all documentation kept in the SWPPPs, including site maps. The SWPPPs are used as an implementation guide for maintaining good housekeeping and reducing stormwater pollution. All appropriate topics are covered in the SWPPPs including:

- Best management practices;
- Facility inspections;
- Facility monitoring;
- Employee training;
- Spill prevention and response;
- Vehicle/equipment cleaning and fueling; and
- Preventative maintenance.

Table 8-2: City Facilities within the Pollution Prevention/Good Housekeeping Program.

Municipal Facility	Physical Address
Charlotte-Douglas International Airport	5501 Josh Birmingham Pkwy., Charlotte, NC 28208
CATS Bus Maintenance Operations Facility	3145 S. Tryon St., Charlotte, NC 28217
CATS Transit Maintenance Operations Center	901 N. Davidson St., Charlotte, NC 28202
CATS Transit Center	310 E. Trade St., Charlotte, NC 28202
CATS Light Rail Maintenance Facility – North Yard	1911 North Brevard Street, Charlotte NC 28202
CATS Light Rail Maintenance Facility – South Yard	3305 Pelton St., Charlotte, NC
CDOT - Traffic Engineering Operations Center	3701 Craig Ave., Charlotte, NC 28211
CDOT – Street Maintenance Division - Northwest District	4411 Northpointe Industrial Blvd., Charlotte, NC 28216
CDOT – Street Maintenance Division - Northeast District	6001 General Commerce Dr., Charlotte, NC 28213
CDOT – Street Maintenance Division - Southwest District	4600 Sweden Rd., Charlotte, NC 28273
Charlotte Water Department - Irwin Creek WWTP	4000 Westmont Dr., Charlotte, NC 28217
Charlotte Water Department - Mallard Creek WWTP	12400 Hwy 29 N, Charlotte, NC 28262
Charlotte Water Department - McAlpine Creek WWTP & Zone 3 Water/Wastewater Operations	12701 Lancaster Hwy, Pineville, NC 28134
Charlotte Water Department - McDowell Creek WWTP	4901 Neck Rd., Huntersville, NC 28078
Charlotte Water Department - Sugar Creek WWTP	5301 Closeburn Rd., Charlotte, NC 28210
Charlotte Water Department - Franklin WTP	5200 Brookshire Blvd, Charlotte, NC 28216
Charlotte Water Department - Lee S Dukes WTP	7980 Babe Stillwell Rd., Huntersville, NC 28078
Charlotte Water Department - Vest WTP	820 Beatties Ford Rd., Charlotte, NC 28216
Charlotte Water Department – Zone 1 Water/Wastewater Field Operations	11609 Hord Dr., Huntersville, NC 28078
Charlotte Water Department – Zone 2 Water/Wastewater Field Operations	5730 General Commerce Dr., Charlotte, NC 28213
Charlotte Water Department – Zone 4 Water/Wastewater Field Operations	4100 W. Tyvola Rd., Charlotte, NC 28208
Charlotte Water Department – Catawba Pump Station	12548 Pump Station Rd., Charlotte, NC 28216
Engineering & Property Management - Heavy Equipment Shop	4600 Sweden Rd., Charlotte, NC 28273
Engineering & Property Management - Heavy Truck Shop / Central Yard Truck Wash	829 Louise Ave., Charlotte, NC 28204
Engineering & Property Management - Light Vehicle Shop	1031 Atando Ave., Charlotte, NC 28216
Engineering & Property Management - Small Engine Repair Shop	701 Tuckaseegee Rd., Charlotte, NC 28208
Engineering & Property Management - 12th Street Vehicle Garage	900 W 12th St, Charlotte, NC 28206
CFD - Fire Logistics	1501 N. Graham St., Charlotte, NC 28206

Municipal Facility	Physical Address
CMPD - Animal Control Shelter	8315 Byrum Dr., Charlotte, NC 28217
CMPD - Police and Fire Training Academy	1770 Shopton Rd., Charlotte, NC 28217
Solid Waste Services - Street Sweeper Facility & Sanitation Packer Lot	829 Louise Ave., Charlotte, NC 28204
Landscape Management Operations	701 Tuckaseegee Rd., Charlotte, NC 28208

8.4 Municipal Facility Inventory and Site Inspections

All parcels of land owned or operated by the City continue to be examined to determine whether they should be included in the Municipal Facilities Inventory within the Pollution Prevention/Good Housekeeping Program. A standard administrative procedure ("SAP") is followed when evaluating parcels for this inventory. Once included in the inventory, applicable facilities receive:

- Preparation and implementation of a SWPPP;
- Regular inspections; and
- Annual employee training.

All facilities included in the inventory are inspected annually with the exception of fire stations which are inspected once every five years. The following are elements of all facility inspections:

- Thorough assessment of facility operations and maintenance activities;
- Evaluation of waste disposal and storage methods;
- Evaluation of the stormwater drainage system, including catch basin inlets, structural best management practices and outfalls;
- Review of spill response and clean up procedures with recommended revisions as appropriate;
- Evaluation of housekeeping practices with recommended revisions as necessary to eliminate potential pollution sources;
- Evaluation of outdoor storage facilities and recommendations for elimination of potential pollution sources;
- Identification and elimination of dry weather discharges;
- Review of SWPPPs where applicable including outfall monitoring (if required by an NPDES permit); and
- Completion of a written report documenting findings and recommendations.

Follow-up inspections, communication and meetings with appropriate personnel are conducted as necessary to eliminate potential pollution sources. The supervisor and other management personnel of each facility are contacted and provided with a copy of the written report. Reports include information about areas and equipment that have a potential for pollution, recommendations for continuing good practices or making minor improvements, any deficiencies requiring more significant improvements, and/or any illicit discharges observed.

All inspections are conducted following the procedures outlined in the Municipal Inspections and Monitoring SAP which is reviewed and updated annually. **Table 8-3** shows the data relative to this program for the report period.

Table 8-3: Municipal Facility Program Results

Activity	Results
New City owned parcels reviewed for inventory	42
Municipal facility inspections conducted	33
SWPPP reviews conducted	33
SPRP reviews conducted	33
SWPPP deficiencies noted	17
Issues detected/corrected at municipal facilities	78
Municipal operation program evaluations conducted	14
Illicit discharges detected through this program[1.]	1

1. This data included in the total Illicit Discharges data shown in Table 5-14.

Ordinance deficiencies and SWPPP issues required corrective action by facility staff.
Figure 8-1 shows the locations of the facilities inspected. (Note: Some CW facilities are located outside the City corporate limits.)

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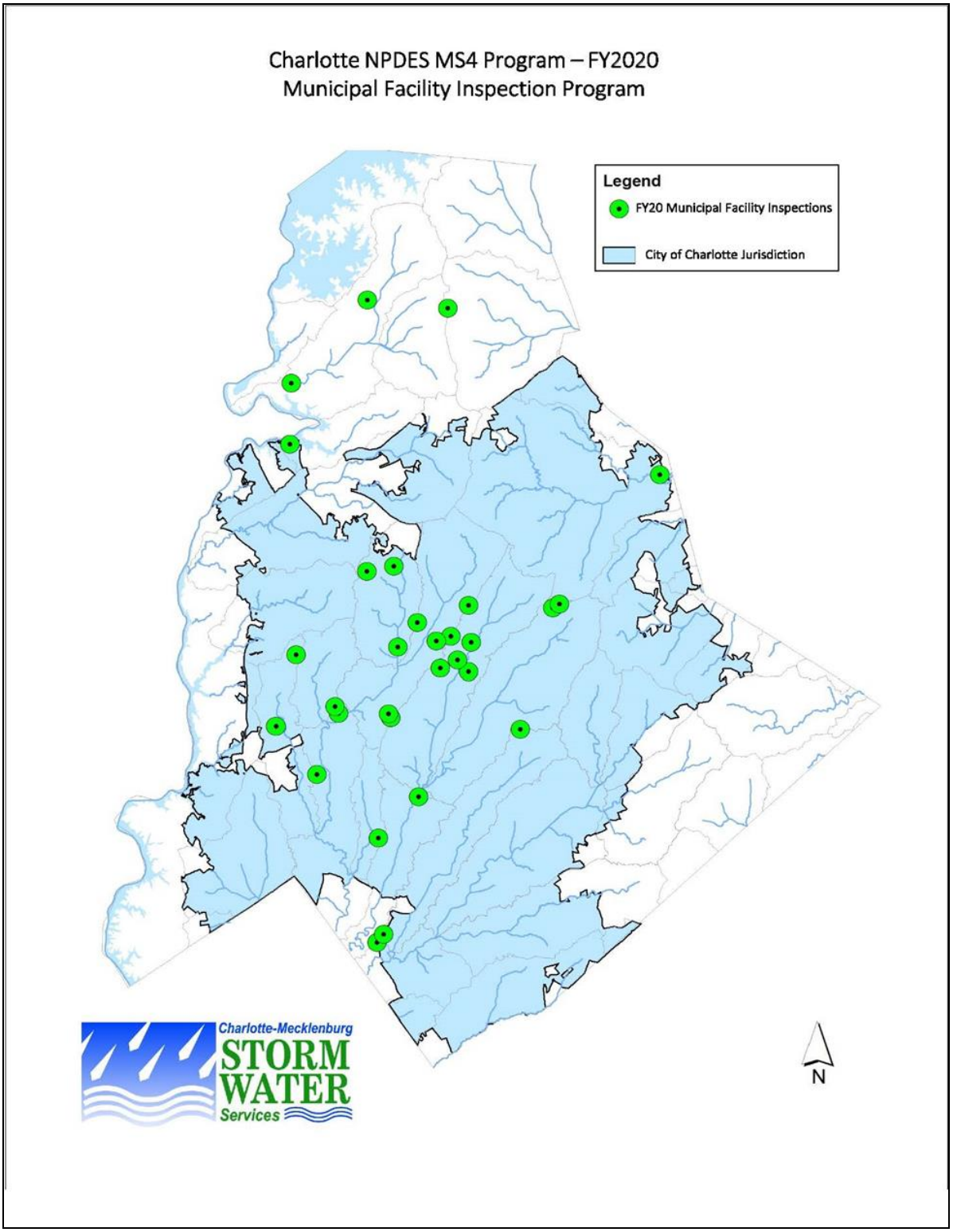
FIGURE 8-1


Charlotte NPDES MS4 Program – FY2020
Municipal Facility Inspection Program
Legend
FY20 Municipal Facility Inspections
City of Charlotte Jurisdiction
Charlotte-Mecklenburg
STORM
WATER
Services
N

8.4.1 NPDES Stormwater Permitted Municipal Facilities Review

Twelve of the 33 municipal facilities discussed in sub-section 8.3 above have their own NPDES stormwater permits (*Note: The airport's permit is a combined stormwater/wastewater individual permit). **Table 8-4** shows these facilities.

Table 8-4: Municipal Facilities with NPDES Stormwater Permits

Municipal Operation	Permit Number	Certificate of Permit Coverage Number	Address
CATS Transit Maintenance Operations Center	NCG080000	NCG080029	901 N. Davidson Street
CATS Bus Maintenance Operations Facility	NCG080000	NCG080710	3145 S. Tryon Street
Heavy Truck Shop, Truck Wash & Street Sweeper Yard	NCG080000	NCG080822	829 Louise Avenue
Heavy Equipment Shop	NCG080000	NCG080840	4600 Sweden Road
Light Vehicle Maintenance Shop	NCG080000	NCG080879	1031 Atando Avenue
12th Street Fleet Maintenance	NCG080000	NCG080063	900 West 12th Street
Charlotte-Douglas International Airport*	NC0083887	Not applicable	5501 Josh Birmingham Parkway
Irwin Creek WWTP	NCG110000	NCG110008	4000 Westmont Drive
Mallard Creek WWTP	NCG110000	NCG110114	12400 Highway 29 North
McAlpine Creek WWTP	NCG110000	NCG110010	12701 Lancaster Hwy
McDowell Creek WWTP	NCG110000	NCG110011	4901 Neck Road
Sugar Creek WWTP	NCG110000	NCG110012	5301 Closeburn Road

Annual inspections are conducted at each facility listed in **Table 8-4**. The same inspection items listed in sub-section 8.4 are reviewed at these permitted facilities. Emphasis is placed on elimination of illicit discharges, good housekeeping improvements, and compliance with permit and SWPPP requirements, including inspections, monitoring and training. The SWPPPs are reviewed and updated annually as required. Environmental management personnel at the airport and five wastewater treatment plants are responsible for updating the SWPPPs at their facilities, while staff of GSD-SWS reviews and updates SWPPPs for the other facilities listed in **Table 8.4**.

Three additional City facilities have No Exposure Certificates: CATS Transit Center, CATS Light Rail Maintenance Facility, and CATS North Yard Light Rail Facility. As required by State regulation, as part of inspections at these facilities, a form certifying continued "No Exposure" conditions is filled out annually and placed in the facility's SWPPP.

8.5 Municipal Spill Response Procedures

Numerous activities conducted by City employees, both in the field and at facilities, have the potential to generate spills that may enter the MS4 and contaminate surface waters. Because of that potential, spill prevention and response procedures (SPRPs) are maintained for all facilities (and associated field operations) listed in **Table 8-2**. These procedures are incorporated into the

facility SWPPPs. The procedures and proper implementation of them is evaluated as part of the annual inspections. Items that are evaluated and incorporated into the procedures included the following:

- Product storage tanks/containers, exposure, and secondary containment;
- Flow path and potential for entry into the MS4;
- Spill history, response to those spills, and documentation;
- Activities that may generate spills;
- Operating procedures to prevent spills;
- Spill response procedures and reporting;
- Spill response equipment and other countermeasures; and
- Employee training.

In addition, to address spills that may occur on municipal streets and in other areas as related to the overall IDDE program, CMSWS staff maintains a 24-hour emergency response team that responds to environmental emergencies. Members of the team act in an advisory role to the Charlotte Fire Department ("CFD") Hazmat Unit. Once Hazmat secures a scene and contains the spill, the team works with the responsible party to ensure that spills are cleaned up properly and have minimal impacts to the environment. The team's actions are guided by a set of written emergency response protocols. During the report period the team responded to emergency response calls, but none were related to the municipal facilities listed in **Table 8-2**.

8.6 Vehicle and Equipment Cleaning Operations

The City recognizes the negative impacts that municipal vehicle and equipment wash water runoff can have on stormwater and, ultimately, surface waters. Municipal employees wash the majority of vehicles and equipment at commercial or municipal vehicle wash facilities that drain to the sanitary sewer system. Vehicle and equipment washing at municipal facilities continue to be assessed during annual inspections at facilities listed in **Table 8-2**, where applicable.

8.7 Streets, Roads, and Public Parking Lots Maintenance

Streets and parking lots can be a significant source of stormwater pollution and the City implements various BMPs to best address polluted stormwater runoff from these sources, as shown below:

- Street sweeping program;
- Adopt-A-Street program;
- Leaf and yard waste collection program;
- Trash receptacles along downtown streets;
- Trash receptacles and litter control activities at Park and Ride parking lots; and
- Public education to address polluted stormwater runoff from municipally-owned streets and public parking lots.

Table 8-5 shows the data relative to this program for the report period.

Table 8-5: Streets/Roads and Parking Maintenance Program Results

Activity	Results*
Streets/roads swept (miles)*	49,063
Streets/roads sweeping debris removed (tons)*	977
Yard waste collected (tons)*	50,008
Adopt-A-Street miles cleaned[6.]	455
Adopt-A-Street bags of trash collected[6.]	2,006
Adopt-A-Street bags of recyclables collected[6.]	400

* This data not included in summary data shown in Table 4-5
6. This data also shown in Table 4-3.

8.8 Municipal SCMs and MS4 System Operation and Maintenance

The City maintains an inventory of municipal structural SCMs which are inspected for proper operation and maintenance at various frequencies based on the type of SCM. The inventory continues to be updated as new SCMs are constructed. Routine maintenance activities for these SCMs include:

- Mowing;
- Trash removal;
- Woody growth removal;
- Cattail removal; and
- Inlet and outlet clearing.

These inspection and maintenance activities are conducted to ensure proper function of structural SCMs.

The GSD-Landscape Management Division and Building Services Division have primary responsibility for conducting inspections and ensuring proper maintenance. Employees at certain facilities where SCMs are located also assist with routine maintenance, such as grass mowing. Standard inspection forms are maintained and utilized to conduct and document inspections. Completed inspection forms are provided to GSD-SWS SCM inspection and maintenance coordinators, who then enter the information into the Cityworks® database. The coordinators also work with City staff responsible for inspections to ensure they are completed as required.

The City conducts extensive cleaning and maintenance of the MS4 system which includes, but is not limited to:

- Catch basin cleaning (manually and with vacuum trucks);
- Storm drain top cleaning;
- Curb and gutter cleaning;
- Culvert/channel cleaning;
- Drainage structure installation and repair;
- Ditch reshaping; and

- Erosion control.

Table 8-6 shows the data relative to this program for the report period.

Table 8-6: Stormwater System Maintenance Program Results

Activity	Results
Catch basins top cleaned (surface grates, inlets, etc.)	35,766
Catch basins cleaned (entire catch basin vacuumed out)	791
Stormwater pipelines cleaned (pipe vacuumed out) (feet)	3,282

8.9 Employee Staff Training at Municipal Facilities

Training is conducted for employees at all of the facilities listed in **Table 8-2**. The goal of training is to inform employees of the actions necessary to reduce the discharge of pollutants from their facilities/operations and protect surface water quality. Topics for this training include:

- Description of common pollutants, their sources and surface water quality impacts;
- Description of the actions that each facility should take to reduce discharges of pollutants, with an emphasis on good housekeeping;
- Description of effective spill prevention measures that should be employed at each facility;
- Discussion of typical pollution sources at municipal operations and specific actions that should be taken to eliminate these sources and protect surface water quality;
- Review of the facility SWPPP, where applicable;
- Explanation of the potential negative consequences of failing to control pollutants at facilities; and
- Overview of IDDE Program and how to report observed surface water quality problems.

High priority facility staff are provided in-person classroom presentations while lower priority facility staff are assigned on-line training. More details about the classroom and on-line training for municipal facilities are described in sub-section 5.5 which is combined with education for employees related to the identification and reporting of illicit discharges. Employee training is typically provided as follows:

- CMSWS staff provides training to employees of most of the municipal facilities listed on **Table 8-2**, except for;
- CATS staff provides the training to its own employees (training modules provided by CMSWS);
- Charlotte Water staff provides the training to its own employees;
- CLT airport staff provides the training to its own employees; and
- Employees from some facilities are assigned an on-line training module.

Table 8-7 shows the data relative to this program for the report period.

Table 8-7: Municipal Facility Employee Training Program Results

Activity	Results
Training sessions conducted (in person)	18
Employees trained at sessions (in person)	423
Employees trained via on-line training module	585
Total employees trained	1,008

8.10 Measurable Goals/Planned Activities for Future Program Years

Table 8-8 describes the various Pollution Prevention/Good Housekeeping Program BMPs and the Measurable Goals and Planned Activities for Future Program Years for each BMP by permit term year.

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Table 8-8: BMP Measurable Goals for the Pollution Prevention/Good Housekeeping Program.

BMP	BMP Description	Measurable Goals (by permit term year)				
		1	2	3	4	5+
Operation and maintenance program for municipal facilities and operations.	Maintain and implement an operation and maintenance program for municipal facilities owned and operated by the permittee that have been determined by the permittee to have significant potential for generating polluted stormwater runoff that has the ultimate goal of preventing or reducing pollutant runoff.	Review and update Operation and Maintenance programs as necessary. Continue operation and maintenance activities per established procedures. (On-going, years 1 – 5+)				
Site Pollution Prevention Plans for municipal facilities and operations.	Maintain and implement Site Pollution Prevention Plans for municipal facilities owned and operated by the permittee that have been determined by the permittee to have significant potential for generating polluted stormwater runoff that has the ultimate goal of preventing or reducing pollutant runoff.	Review and update facility SWPPPs as necessary. Continue implementation of SWPPPs. (On-going, years 1 – 5+)				
Inspection and evaluation of municipal facilities and operations.	Maintain an inventory of municipal facilities and operations owned and operated by the permittee that have been determined by the permittee to have significant potential for generating polluted stormwater runoff, including the MS4 system and associated structural SCMs, conduct inspections at facilities and operations owned and operated by the permittee for potential sources of polluted runoff, the stormwater controls, and conveyance systems, and evaluate the sources, document deficiencies, plan corrective actions, implement appropriate controls, and document the accomplishment of corrective actions.	Review and update inventory of facilities for inspection. Conduct inspections of applicable facilities and make corrective actions where necessary. (On-going, years 1 – 5+)				
Spill Response Procedures municipal facilities and operations.	Maintain spill response procedures for municipal facilities and operations owned and operated by the permittee that have been determined by the permittee to have significant potential for generating polluted stormwater runoff.	Review facility spill response procedures and update as necessary. Continue implementation of procedures. (On-going, years 1 – 5+)				
Prevent or Minimize Contamination of Stormwater Runoff from all areas used for Vehicle and Equipment Cleaning	Describe measures that prevent or minimize contamination of the stormwater runoff from all areas used for vehicle and equipment cleaning, including fire stations that serve more than three fire trucks and ambulances. Perform all cleaning operations indoors, cover the cleaning operations, ensure wash water drains to the sanitary sewer system, collect stormwater runoff from the cleaning area and providing treatment or recycling, or other equivalent measures. If sanitary sewer is not available to the facility and cleaning operations take place outdoors, the cleaning operations shall take place on grassed or graveled areas to prevent point source discharges of the wash water into the storm drains or surface waters.	Review procedures for vehicle and equipment cleaning operations and update as necessary. Ensure that corrective actions are implemented where operations are found to not be in compliance with the permit. (On-going, years 1 – 5+)				

	Where cleaning operations cannot be performed as described above and when operations are performed in the vicinity of a storm drainage collection system, the drain is to be covered with a portable drain cover during cleaning activities. Any excess standing water shall be removed and properly handled prior to removing the drain cover. Facilities that serve three or fewer fire trucks and ambulances and that cannot comply with these requirements shall incorporate structural measures during facility renovation.			
Streets, roads, and public parking lots maintenance	The permittee shall evaluate BMPs to reduce polluted stormwater runoff from municipally-owned streets, roads, and public parking lots within the corporate limits. Within 12 months of permit issuance, the permittee must update its Stormwater Plan to include the BMPs selected.	Evaluate various types of BMPs that would best address polluted stormwater runoff from municipally-owned streets and parking lots and select BMPs based on the evaluation by Feb 28, 2014.	None (years 2 – 5^{+})	
Streets, roads, and public parking lots maintenance	Within 24 months of permit issuance, the permittee must implement BMPs selected to reduce polluted stormwater runoff from municipally-owned streets, roads, and public parking lots identified by the permittee in the Stormwater Plan.	None	Implement BMPs selected from year one evaluation by Feb 28, 2015.	Continue to implement selected BMPs. (On-going, years 3 – 5^{+})
Operation and Maintenance (O&M) for municipally-owned or maintained structural SCMs and the storm sewer system (including catch basins, the conveyance system, and structural stormwater controls).	Within 12 months of permit issuance, the permittee shall develop and implement an operation and maintenance program for structural SCMs and the storm sewer system (including catch basins, the conveyance system, and structural stormwater controls).	Continue to implement structural SCM operation, maintenance, and inspection program. Continue operation and maintenance program for the MS4 system. (On-going, years 1 – 5^{+})		
Staff training	Maintain and implement a training plan that indicates when, how often, who is required to be trained and what they are to be trained on.	For facilities included in the municipal facility inspection program, conduct staff training on SWPPPs and Spill Response Procedures according to the Training Plan. (On-going, years 1 – 5^{+})		

8.11 Program Assessment

The overall Pollution Prevention and Good Housekeeping Program was successfully implemented during the annual report period. **Table 8-9** shows a summary of the various items and corresponding data results for activities conducted under the program.

Table 8-9: Program Summary

MUNICIPAL GOOD HOUSEKEEPING PROGRAM	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024
New City-owned parcels reviewed for inventory	35	42				
Municipal facilities inspected[7.]	32	33				
Municipal operation program evaluations	17	14				
Municipal facility issues detected/corrected	72	78				
Municipal facility employee training sessions	86	18				
Municipal facility employees trained	1,993	1,008				

7. Not all City-owned parcels are included in the municipal inspection program; only those on the official Municipal Facility Inventory. See Sec 8.4

The following is clarification of numbers provided in Table 8-9:

- Number of City owned parcels inventoried includes properties purchased in the previous calendar year;
- Number of municipal facilities inspected includes those at which CMSWS staff conducted inspections;
- Municipal operation program evaluations include reviews (field observations, meetings, etc.) of municipal field operations (including municipal construction) and/or implementation of stormwater pollution prevention best practices;
- Issues detected/corrected includes the number of facility and SWPPP recommendations made as a result of municipal facility inspections that needed correction;
- Employee training sessions includes classroom sessions (conducted by CMSWS, CW, CATS, and the Airport) and number of facilities assigned the on-line training module; and
- Employees trained includes all employees who completed training as described in the previous bullet.

The City maintains a very comprehensive Good Housekeeping and Pollution Prevention program which has expanded in program depth and scope each year. With the frequency of inspections and training received, municipal facility staff has grown in awareness and knowledge of stormwater pollution prevention issues; however, with the large growth in the City, there is still room for process improvement. Specific focus areas for this include:

- Develop and improve upon stormwater pollution prevention best management practices among municipal field operations;
- Investigate and support the allocation of more resources for street sweeping to support surface water quality improvements;

- Implement procedures that help departments utilize city-wide spill response contracts;
- Improve contract language and guidance for contractors regarding the expectation for preventing illicit discharges and the BMPs that may be used in various operations;
- Integrate structural stormwater BMPs and green infrastructure into municipal projects and infrastructure, where feasible; and
- Continue to implement various means of training municipal staff about BMPs for facilities and field practices.

Section 9: Program to Monitor and Control Pollutants in Stormwater Discharges to Municipal Systems

During the annual report period, inspection and monitoring activities were conducted under the Program to Monitor and Control Pollutants in Stormwater Discharges to Municipal Systems per the SWMP. The following sub-sections explain:

- The BMPs implemented to meet program requirements;
- Measures of success;
- Future goals and planned activities; and
- Program assessment.

9.1 BMP Summary Table

Table 9-1 provides information concerning the BMPs implemented to fulfill the requirements of the Industrial Facilities Program.

Table 9-1: BMP Summary Table for the Program to Monitor and Control Pollutants in Stormwater Discharges to Municipal Systems.

BMP	BMP Description	Schedule (years)					Responsible Position
		1	2	3	4	5	
Maintain an Inventory of Industrial Facilities	Maintain an inventory of permitted hazardous waste treatment, disposal, and recovery facilities, industrial facilities that are subject to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), industrial facilities identified with an industrial activity permitted to discharge stormwater to the permittee's MS4, or as identified as an illicit discharge under the IDDE Program. For the purposes of this permit, industrial activities shall mean all permitted industrial activities as defined in 40 CFR 122.26.	X	X	X	X	X	Water Quality Program Manager
Inspection Program	Identify priorities and inspection procedures. At a minimum, priority facilities include those identified above in subsection II.H.2.a.	X	X	X	X	X	Water Quality Program Manager

BMP	BMP Description	Schedule (years)					Responsible Position
		1	2	3	4	5	
Evaluate Industrial Facilities discharging stormwater to the City's MS4	The Permittee is required to evaluate control measures implemented at permitted hazardous waste treatment, disposal, and recovery facilities, industrial facilities that are subject to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), industrial facilities identified with an industrial activity permitted to discharge stormwater to the permittee's MS4, or as identified as an illicit discharge under the IDDE Program. For permitted facilities, the municipality shall establish procedures for reporting deficiencies and non-compliance to the permitting agency. Where compliance with an existing industrial stormwater permit does not result in adequate control of pollutants to the MS4, municipality will recommend and document the need for permit modifications or additions to the permit issuing authority. For the purposes of this permit, industrial activities shall mean all permitted industrial activities as defined in 40 CFR 122.26. For the purpose of this permit, the Permittee is authorized to inspect the permitted hazardous waste treatment, disposal, and recovery facilities as an authorized representative of the Director.	X	X	X	X	X	Water Quality Program Manager

9.2 Industrial Facility Inventory

An inventory of facilities is maintained showing those facilities that discharge to the City's MS4 and have the potential to discharge significant pollutant loads. The inventory is used to select each year's facilities for inspection and monitoring. Facilities included in the inventory fit into one or more of the following categories:

- Hazardous waste TSD facility;
- SARA Title III facility (TRI reporter);
- NPDES Stormwater permitted facility;
- Stormwater No Exposure Certificate facility;
- Industrial Wastewater Pre-Treatment permitted facility; and
- Facilities identified as having an illicit discharge under the IDDE Program.

9.3 Industrial Facilities Inspection Program

The purpose of the Industrial Facilities Inspection program is to evaluate activities at industrial facilities that may impact stormwater discharges, and then work with identified problem facilities to reduce stormwater pollution from the facility.

The overall goal of the program is to inspect all NPDES stormwater permitted facilities listed in the facility inventory about once every five (5) years on average, but a facility may be inspected more frequently if it has had previous compliance issues or it is deemed to have a higher potential for stormwater pollution. Likewise, a permitted facility may be inspected less frequently if it is deemed to have less potential for stormwater pollution. To support this prioritization strategy, CMSWS staff developed a document that details the criteria for each priority tier and a flow chart that guides the ongoing prioritization of facilities. Each year staff update the facility database by assigning a priority tier for each facility.

Non-permitted industrial facilities are also selected for inspection based on the recommendation of CMSWS staff, citizen complaints, or from viewing aerial photography that indicate potential pollution issues at a site. It is important to note that many of the facilities in the master database that are selected for inspection each year, whether they have an NPDES stormwater permit or not, also fall into other facility categories such as being a hazardous waste TDR facility, SARA Title III facility, and/or a permitted industrial pre-treatment facility.

In addition to the above, vehicle maintenance facilities are included as part of the program due to the potential of finding poor housekeeping practices and illicit discharges at these facilities. Aerial photography and drive-by visits are used to select vehicle maintenance facilities for inspection based on their appearance of having a higher potential to pollute.

To effectively accomplish the goals of the program, an Industrial Facilities Inspection and Monitoring Procedures Manual is utilized. The manual objectives are as follows:

- Provide instructions and guidance about the selection of facilities for inspections, prepare for and conduct industrial inspections and monitoring, collect vital information, write reports and conduct follow-up activities;
- Provide consistency for program implementation as a means of quality assurance and control; and
- Provide forms, templates and examples to aid in implementation of the program.

The manual also details the inspection process. Listed below are general tasks conducted as part of an industrial inspection:

- Thorough assessment of facility operations and maintenance activities;
- Evaluation of waste disposal and storage methods;
- Evaluation of the stormwater drainage system, including catch basin inlets, structural best management practices and outfalls;

- Review of spill response and clean up procedures;
- Evaluation of housekeeping practices with recommended revisions as necessary to eliminate potential pollution sources;
- Evaluation of outdoor storage facilities and recommendations for elimination of potential pollution sources;
- Identification and elimination of dry weather discharges;
- Review of SWPPP implementation where applicable, including outfall monitoring (if required by permit);
- Sampling/monitoring of site stormwater runoff and/or dry weather flows;
- Evaluation of monitoring data results; and
- Completion of a written report documenting findings and recommendations.

A standard inspection form is used for conducting all industrial facility inspections. A different inspection form is used for vehicle maintenance facility inspections. For inspections at NPDES stormwater permitted facilities, any deficiencies related to NPDES stormwater permit requirements are identified and included in the report, with a copy sent to the NCDEQ. The understanding between CMSWS and NCDEQ is that the State is responsible for following up on permit-related deficiencies and violations since they are the regulatory authority for the issued permits. Facilities that are found without coverage under an appropriate general stormwater permit category are also brought to the attention of NCDEQ. All facilities where deficiencies are noted receive follow-up correspondence and inspections from CMSWS staff to assist with compliance.

Table 9-2 shows the data relative to this program for the report period.

Table 9-2: Industrial Facility Program Results

Activity	Results
Industrial facility inspections conducted	40
Vehicle maintenance facility inspections conducted	22
Industrial facilities monitored	9
Illicit discharges detected through this program[1.]	3
SWPCO NOVs issued[2.]	3
Notices of Deficiency issued	4

1. This data included in the total Illicit Discharges data shown in Table 5-14.
2. This data included in the total NOVs data shown in Table 5-2.

Figures 9-1 and **9-2** show the location of these facilities.

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FIGURE 9-1

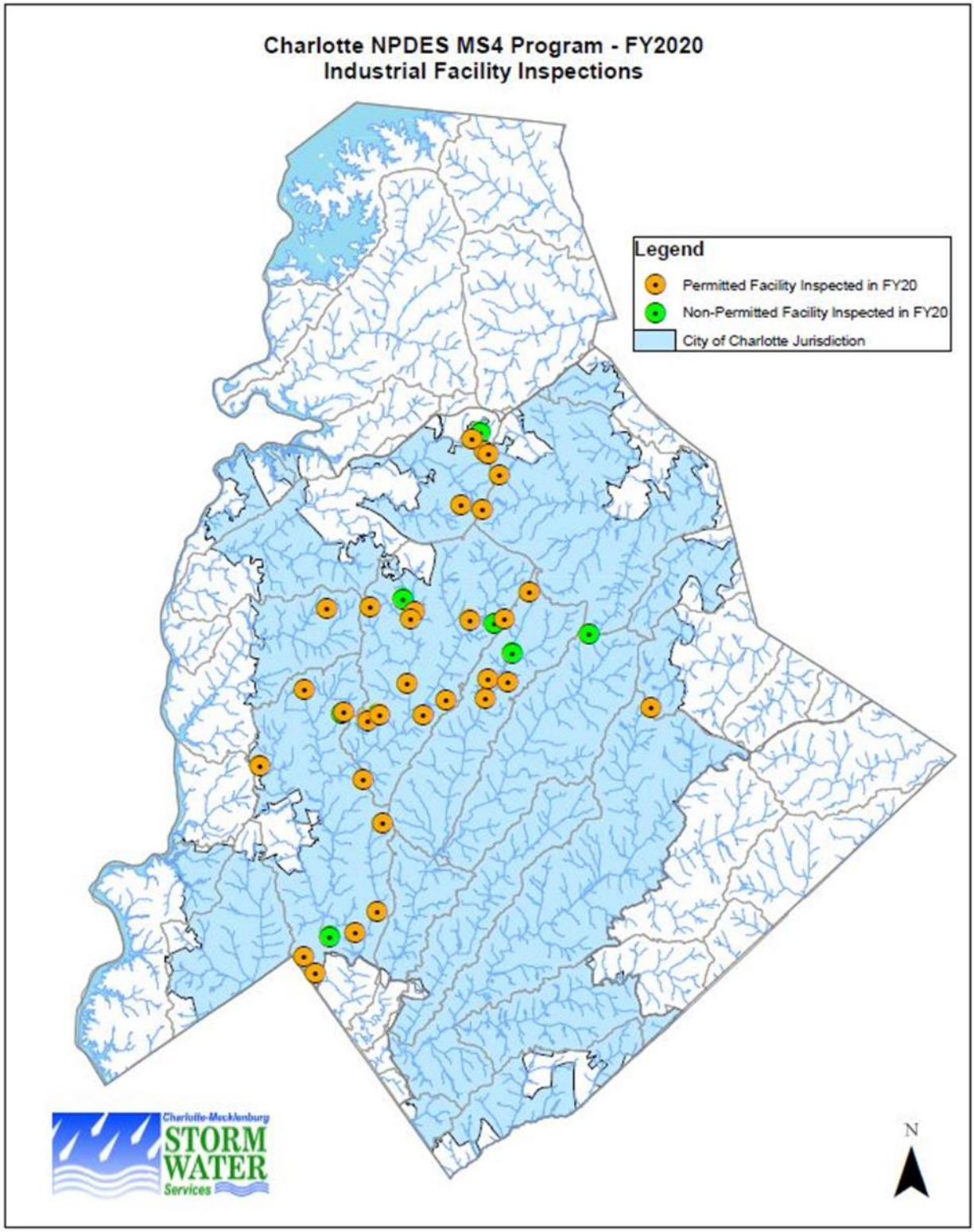
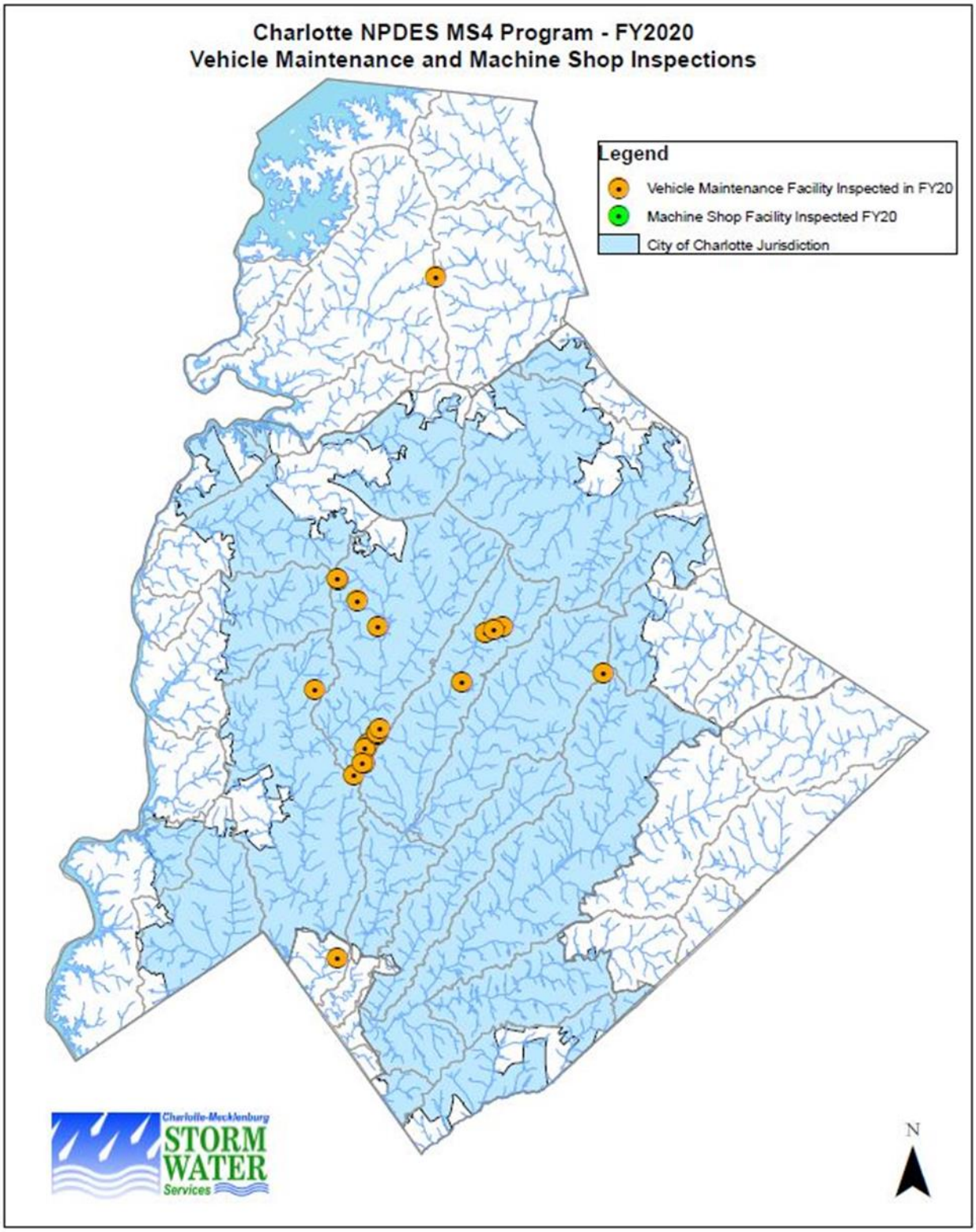

Charlotte NPDES MS4 Program - FY2020
Industrial Facility Inspections
Legend
Permitted Facility Inspected in FY20
Non-Permitted Facility Inspected in FY20
City of Charlotte Jurisdiction
Charlotte-Mecklenburg
STORM WATER
Services
N

FIGURE 9-2


Charlotte NPDES MS4 Program - FY2020
Vehicle Maintenance and Machine Shop Inspections
Legend
Vehicle Maintenance Facility Inspected in FY20
Machine Shop Facility Inspected FY20
City of Charlotte Jurisdiction
Charlotte-Mecklenburg
STORM WATER
Services
N

9.3.1 Industrial Facilities Monitoring Program

The purpose of the Industrial Facilities Monitoring Program is to monitor stormwater runoff from select industrial facilities and identify and correct pollution sources related to industrial activities. Facilities monitored consist of both those with and without an NPDES stormwater permit. Some facilities also fall into other categories such as a hazardous waste TDR facility, SARA Title III facility, and/or a permitted industrial pre-treatment facility. Facilities are selected based on input from the CMSWS inspectors who inspected these facilities under the Industrial Inspections Program during the previous fiscal year.

All monitoring data from these facilities is reviewed and compared with permit benchmarks (if applicable), past monitoring results from the CMSWS industrial monitoring program, and in-stream state surface water quality standards. An SAP is utilized for comparing industrial stormwater monitoring results to these numbers and is reviewed and updated annually.

Once data is reviewed, a letter summarizing the analytical sampling results is sent to each monitored facility. Copies of this letter are also provided to NCDEQ for NPDES permitted facilities for potential follow-up for permit deficiencies or recommendations for acquiring or modifying a permit. For facilities with elevated pollutant levels, recommendations are made to improve outdoor operations, housekeeping, material storage practices, and other measures that should result in reduced pollutant runoff. Follow-up inspections are then conducted to ensure that recommendations/requirements for eliminating pollution sources are implemented. All procedures for the Industrial Facilities Monitoring Program are outlined in the Industrial Inspection Procedures Manual and reviewed annually.

Table 9-2 shows the number of facilities monitored during wet weather conditions for the report period.

9.4 Evaluation Measures

As discussed in sub-section 9.3, the appropriate evaluation measures that are implemented to reduce polluted discharges to the City's MS4 are industrial inspections and monitoring. Inspection letters note that the inspection is being conducted to satisfy both State and City NPDES MS4 permit requirements. As pollution sources are identified through the inspection and monitoring program, CMSWS worked with the NCDEQ and facility personnel to eliminate the pollution sources. When violations of SWPCO prohibitions and other applicable regulations are identified, enforcement measures are implemented either by the City or NCDEQ, as applicable.

9.5 Measurable Goals/Planned Activities for Future Program Years

Table 9-3 describes the various Industrial Facilities Program BMPs and the Measurable Goals and Planned Activities for Future Program Years for each BMP by permit term year.

Table 9-3: BMP Measurable Goals for the Industrial Facilities Program.

BMP	BMP Description	Measurable Goals (by permit term year)				
		1	2	3	4	5+
Maintain an Inventory of Industrial Facilities	Maintain an inventory of permitted hazardous waste treatment, disposal, and recovery facilities, industrial facilities that are subject to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), industrial facilities identified with an industrial activity permitted to discharge stormwater to the permittee's MS4, or as identified as an illicit discharge under the IDDE Program. For the purposes of this permit, industrial activities shall mean all permitted industrial activities as defined in 40 CFR 122.26.	Maintain and update the industrial facility inventory as needed. (On-going, years 1 – 5+)				
Inspection Program	Identify priorities and inspection procedures. At a minimum, priority facilities include those identified above in subsection II.H.2.a.	Update current Industrial Inspection and Monitoring Procedures and develop an inspection prioritization strategy. (On-going, years 1 – 5+)				
Evaluate Industrial Facilities discharging stormwater to the City's MS4	The Permittee is required to evaluate control measures implemented at permitted hazardous waste treatment, disposal, and recovery facilities, industrial facilities that are subject to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), industrial facilities identified with an industrial activity permitted to discharge stormwater to the permittee's MS4, or as identified as an illicit discharge under the IDDE Program. For permitted facilities, the municipality shall establish procedures for reporting deficiencies and non-compliance to the permitting agency. Where compliance with an existing industrial stormwater permit does not result in adequate control of pollutants to the MS4, municipality will recommend and document the need for permit modifications or additions to the permit issuing authority. For the purposes of this permit, industrial activities shall mean all permitted industrial activities as defined in 40 CFR 122.26. For the purpose of this permit, the Permittee is authorized to inspect the permitted hazardous waste treatment, disposal, and recovery facilities as an authorized representative of the Director.	Conduct inspection activities based on established procedures and prioritization strategy at 50 facilities for years 1 and 2; and 40 facilities in years 3 -5+. Conduct stormwater runoff monitoring at 10 facilities for years 1 and 2; and 8 facilities in years 3 -5+.				

9.6 Program Assessment

The overall Industrial Facilities and Monitoring Program was successfully implemented during the annual report period. **Table 9-4** shows a summary of the various items and corresponding data results for activities conducted under the program.

Table 9-4: Program Summary

INDUSTRIAL FACILITIES PROGRAM	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024
Master industrial inspection inventory sites	514	515				
Facilities inspected	63	62				
Facilities monitored	12	9				
Notices of Deficiency issued	15	4				

Inspection and monitoring of industrial and vehicle maintenance facilities continued to be an effective strategy at controlling polluted stormwater runoff into the City's municipal stormwater system. The program has been adapted in many ways over the years with the aim at improving effectiveness at identifying illicit discharges and reducing polluted stormwater runoff. One of those improvements, developing and following a prioritization strategy for selecting facilities to inspect each year, has helped to focus on facilities with the most problems based on inspection and monitoring history and other factors.

While the program involves doing inspections and monitoring, staff recognize the vital importance of following up on reports indicating deficiencies. Staff conduct additional inspections to follow up on corrective actions for illicit discharges and recommendations for poor housekeeping and other deficiencies. Program staff also recognize the importance of communicating and working with NC DEQ staff for facilities with NPDES stormwater permit coverage. In addition to copying DEQ on permitted facility reports, staff often have follow-up communications regarding deficiencies and sometimes conduct joint follow-up inspections.

One focus area over the past couple of years has been at concrete facilities because compliance problems were often identified at those facilities. All of the permitted concrete facilities were inspected over the past couple years, and staff got NCDEQ staff involved to help resolve issues and provide guidance on permit compliance. Staff will continue to focus on concrete facilities in future years to help address any ongoing concerns.

Section 10: Water Quality Assessment and Monitoring Program

During the annual report period, monitoring activities were conducted per the Water Quality Assessment and Monitoring program plan and the SWMP. The following sub-sections explain:

- The BMPs implemented to meet program requirements;
- Measures of success;

- Future goals and planned activities; and
- Program assessment.

10.1 BMP Summary Table

Table 10-1 provides information concerning the BMPs implemented to fulfill the requirements of the Water Quality Assessment and Monitoring Program.

Table 10-1: BMP Summary Table for the Water Quality Assessment and Monitoring Program.

BMP	BMP Description	Schedule (years)					Responsible Position
		1	2	3	4	5	
Water Quality Assessment and Monitoring Plan	Maintain a Water Quality Assessment and Monitoring Plan. The Plan shall include a schedule for implementing the proposed assessment and monitoring activities.	X	X	X	X	X	Water Quality Program Manager
Water Quality Monitoring	Maintain and implement the Water Quality Assessment and Monitoring Plan submitted to DWQ.	X	X	X	X	X	Water Quality Program Manager

10.2 Water Quality Assessment and Monitoring Plan

The City has been conducting surface water quality monitoring of streams and stormwater discharges since the inception of its NPDES MS4 Permit Program in 1992. Initially, the monitoring program focused mainly on identifying illicit discharges and especially SSOs, and therefore included sampling for fecal coliform bacteria. Data is used to identify and eliminate these illicit discharges to the MS4 and surface waters and has proven to be highly successful. While current surface water quality monitoring efforts continue to be used for this purpose, the program expanded over the years to include a wider array of water quality parameters (**Table 10-2**) with the additional goal of identifying short-term and long-term surface water quality trends and gauging overall program effectiveness.

Table 10-2: Water Quality Monitoring Parameters.

Parameter	Sample Type	Frequency (Minimum)
Fecal Coliform	Grab	Quarterly
E-Coli	Grab	Quarterly
Total Phosphorus	Grab	Quarterly
Nitrite + Nitrate	Grab	Quarterly
Total Kjeldahl Nitrogen	Grab	Quarterly
Ammonia Nitrogen	Grab	Quarterly
Total Suspended Solids	Grab	Quarterly
Turbidity	Grab	Quarterly
Copper	Grab	Quarterly
Zinc	Grab	Quarterly

Parameter	Sample Type	Frequency (Minimum)
Chromium	Grab	Quarterly
Lead	Grab	Quarterly
Dissolved Oxygen	In Situ	Quarterly
Temperature	In Situ	Quarterly
Conductivity	In Situ	Quarterly
pH	In Situ	Quarterly

The City implements the Water Quality Assessment and Monitoring Plan developed during the previous permit term. The plan specifies the basic surface water quality monitoring program and activities to be performed on a quarterly basis at 15 stream sites within the major watersheds in the City (**Figure 10-1; Table 10-3)**. Monitoring is conducted for chemical and physical parameters listed in **Table 10-2** on a fixed interval monitoring basis.

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FIGURE 10-1

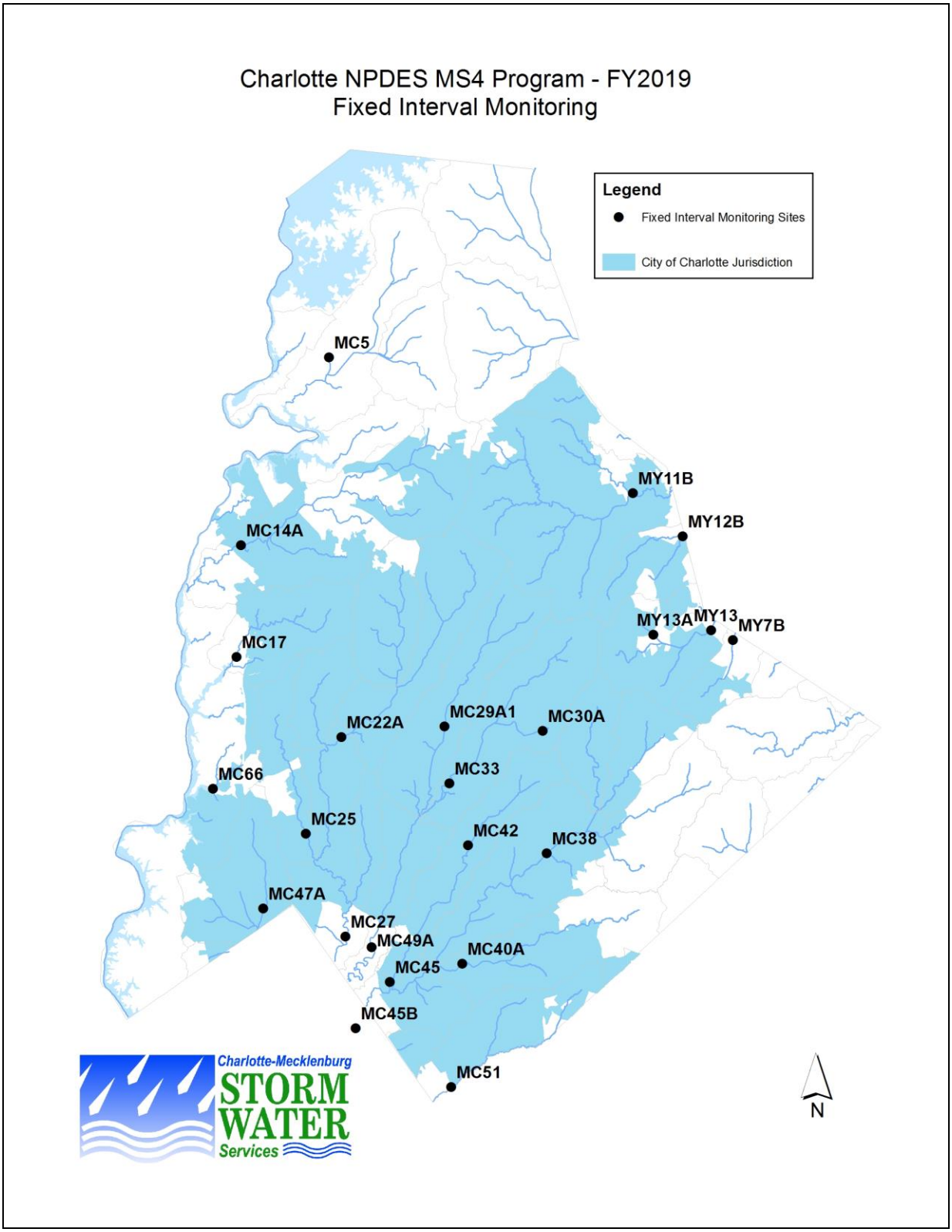
Charlotte NPDES MS4 Program - FY2019
Fixed Interval Monitoring
Legend
Fixed Interval Monitoring Sites
City of Charlotte Jurisdiction
MC5
MY11B
MY12B
MC14A
MY13A
MY13
MY7B
MC17
MC22A
MC29A1
MC30A
MC66
MC33
MC25
MC42
MC38
MC47A
MC27
MC49A
MC40A
MC45
MC45B
MC51
Charlotte-Mecklenburg
STORM
WATER
Services
N

Table 10-3: Description of City of Charlotte Surface Water Quality Monitoring Sites.

Site #	Stream	Location
MY11B	Mallard Creek	Pavilion Blvd Bridge, S. of US Hwy 29
MY12B	Back Creek	Stream location, off of Wentwater Street, near Caldwell Rd.
MY13	Reedy Creek	Reedy Creek Rd. Bridge, S. of Plaza Rd. Ext.
MY7B	McKee Creek	Reedy Creek Rd. Bridge, S. of Harrisburg Rd.
MC14A	Long Creek	Pine Island Dr. at End of Street at Golf Course
MC17	Paw Creek	Hwy 74 Culvert, Between Sam Wilson & Little Rock Rd.
MC22A	Irwin Creek	Westmont Dr. Bridge, at Irwin Creek WWTP
MC27	Sugar Creek	Hwy. 51 Bridge, E. of Downs Rd.
MC38	McAlpine Creek	Sardis Rd. Bridge, Between Sardis Ln. & Sardis Rd. N.
MC40A	Four Mile Creek	Elm Ln. Bridge, S. of Hwy. 51
MC42	McMullen Creek	Sharon View Rd. Bridge, Between Sharon Rd. & Colony Rd.
MC45	McAlpine Creek	McAlpine Creek WWTP
MC47A	Steele Creek	Carowinds Blvd. Culvert, W. of Carowinds Amusement Park
MC49A	Little Sugar Creek	Hwy. 51 Bridge, W. of Carolina Place Mall
MC51	Six Mile Creek	Marvin Rd. Bridge, S. of Ardrey Kell Rd.

10.3 Surface Water Quality Monitoring Implementation

The City conducts a basic quarterly fixed interval monitoring program at the 15 monitoring sites listed in **Table 10-3**. Following completion of monitoring activities at the end of each permit reporting year (June 30th), monitoring data is assessed to determine whether surface water quality trends are apparent. This can help to gauge the combined effectiveness of NPDES program efforts. In addition to the basic monitoring required in the plan, the City also conducts an enhanced monitoring program which includes additional parameters, sites and frequencies to support other initiatives and management activities.

Table 10-4 shows all data relative to this program for the report period, which is above the minimum requirements contained in the monitoring plan.

Table 10-4: Surface Water Quality Monitoring Program Results

Activity	Results
Stream sites monitored	23
Sampling events	11
Stream samples collected	253
Laboratory sample analyses conducted	3,036
Stream physical measurements conducted (DO, Temp, pH, Cond)	1,012
Illicit discharges detected through this program[1.]	1

1. This data included in the total Illicit Discharges data shown in Table 5-14.

10.4 Water Quality Assessment and Monitoring Plan Revisions

The City has reviewed the basic monitoring program plan and data generated during the report period and proposes only minor changes to the plan during FY2021. The updated plan will be submitted to NCDEQ for review and approval upon completion.

10.5 Measurable Goals/Planned Activities for Future Program Years

Table 10-5 describes the Water Quality Assessment and Monitoring Program BMPs and the Measurable Goals and Planned Activities for Future Program Years for each BMP by permit term year.

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Table 10-5: BMP Measurable Goals for the Water Quality Assessment and Monitoring Program.

BMP	BMP Description	Measurable Goals (by permit term year)				
		1	2	3	4	5
Water Quality Assessment and Monitoring Plan	Maintain a Water Quality Assessment and Monitoring Plan. The Plan shall include a schedule for implementing the proposed assessment and monitoring activities.	Maintain the WQ Assessment & Monitoring Plan and update as necessary. (On-going, years 1 – 5^{+})				
Water Quality Monitoring	Maintain and implement the Water Quality Assessment and Monitoring Plan submitted to DWQ.	Maintain and implement the monitoring plan and conduct WQ assessment and monitoring activities per the plan. (On-going, years 1 – 5^{+})				

10.6 Program Assessment

The overall Water Quality Assessment and Monitoring Program was successfully implemented during the annual report period. **Table 10-6** shows a summary of the various items and corresponding data results for activities conducted under the program.

Table 10-6: Program Summary

SURFACE WATER QUALITY MONITORING PROGRAM	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024
Stream sites monitored	23	23				
Stream samples collected	276	253				
Laboratory sample analyses conducted	3,312	3,036				
Stream physical measurements (DO, Temp, pH, Cond)	1,104	1,012				

10.6.1 Surface Water Quality Monitoring Program Evaluation

An evaluation of the enhanced surface water quality monitoring program was conducted to determine whether any changes were needed to improve the cost-effectiveness of the program. This evaluation resulted in the removal of enhanced program parameters *Enterococcus* and several total metals (beryllium, selenium, cadmium, and silver) from the monitoring program. *Enterococcus* was removed because it was determined to be unnecessary to collect in addition to *E. coli* and fecal coliform. The total metals mentioned above were removed because they were consistently below detection limits and surface water quality standards. Data analysis continued through the report period, but no additional changes to the monitoring program have been made.

10.6.2 Surface Water Quality Trend Analysis

The City utilizes surface water quality data generated from various monitoring programs, including NPDES MS4, to generate a Stream Use Support Index. This spatial index visually represents surface water quality conditions by sub-basin and can be compared year by year to determine general trends. The index map for calendar year 2019 is shown below in **Figure 10-2**. The map shows surface water quality ("SWQ") conditions to be in the partially supporting to impaired category for the sub-basins within the City.

Figure 10-3 shows time series graphs for each non-metal parameter in the monitoring plan for the ten-year period from Jan 2010 to Jun 2020 (metals are shown separately in **Figure 10-4**). Each graph displays median analyte values across all sites for each particular fixed interval sampling event (i.e., quarterly at minimum, though typically monthly). Because monitoring is done on the same day each month regardless of current or antecedent weather conditions, data represents a mixture of ambient and storm-impacted flows. Additional analyses, considering each analyte and watershed individually combined with normalization for flow conditions at the time of sampling, will likely be needed to further discern surface water quality trends. These analyses are ongoing and may be reported in future annual reports.

FIGURE 10-2

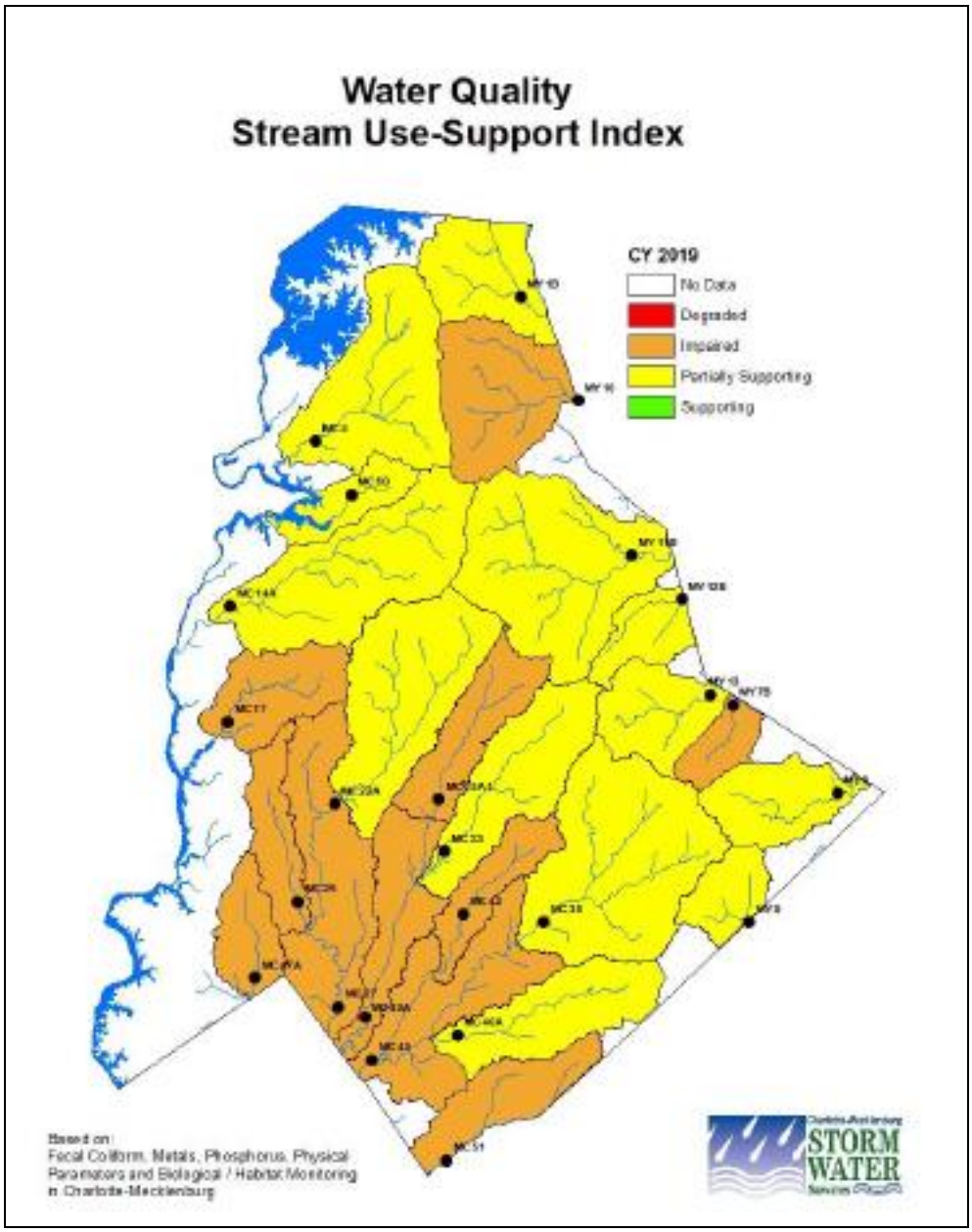
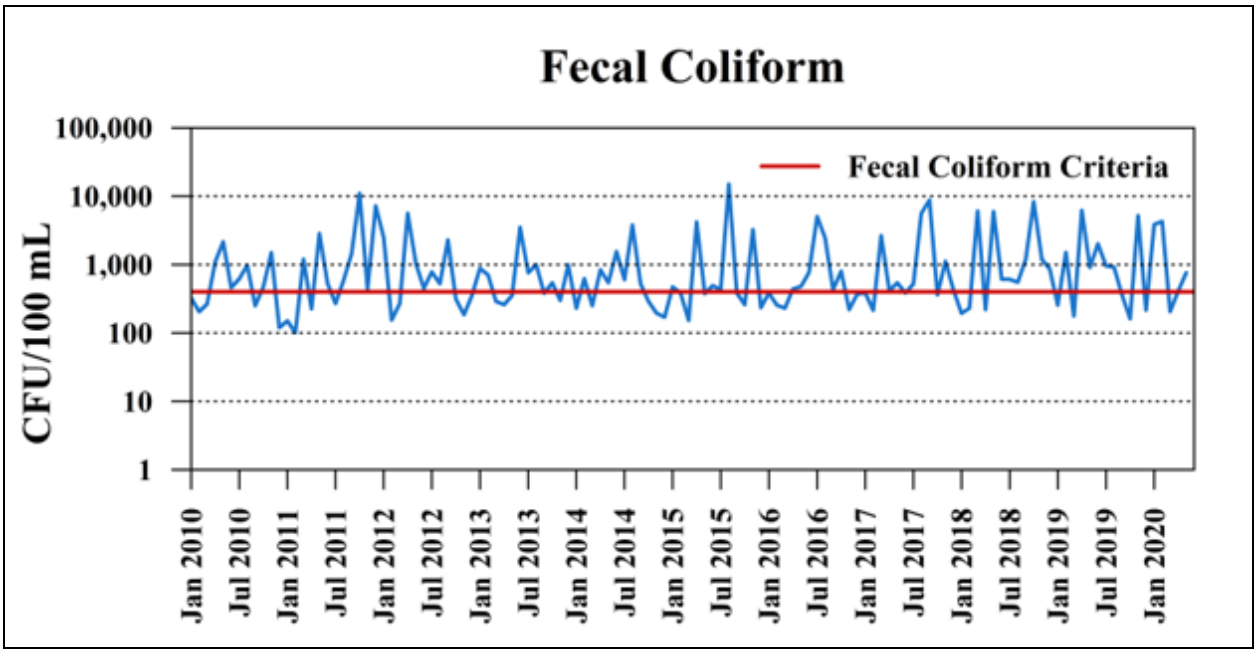
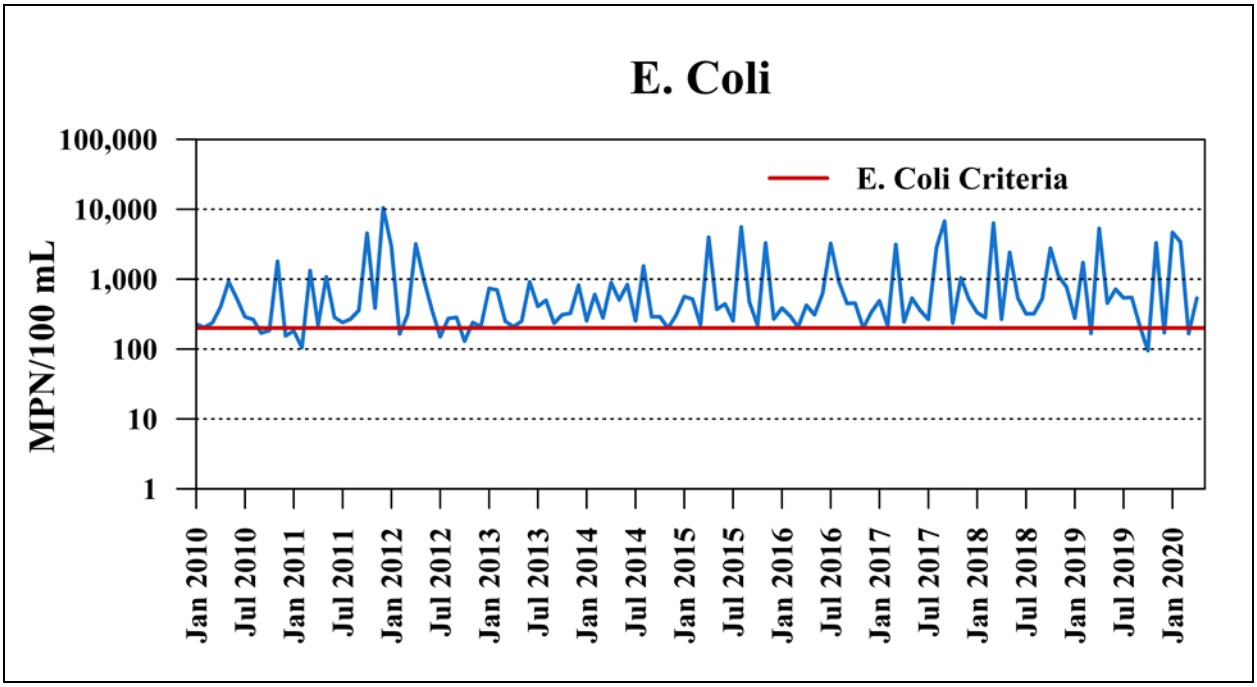
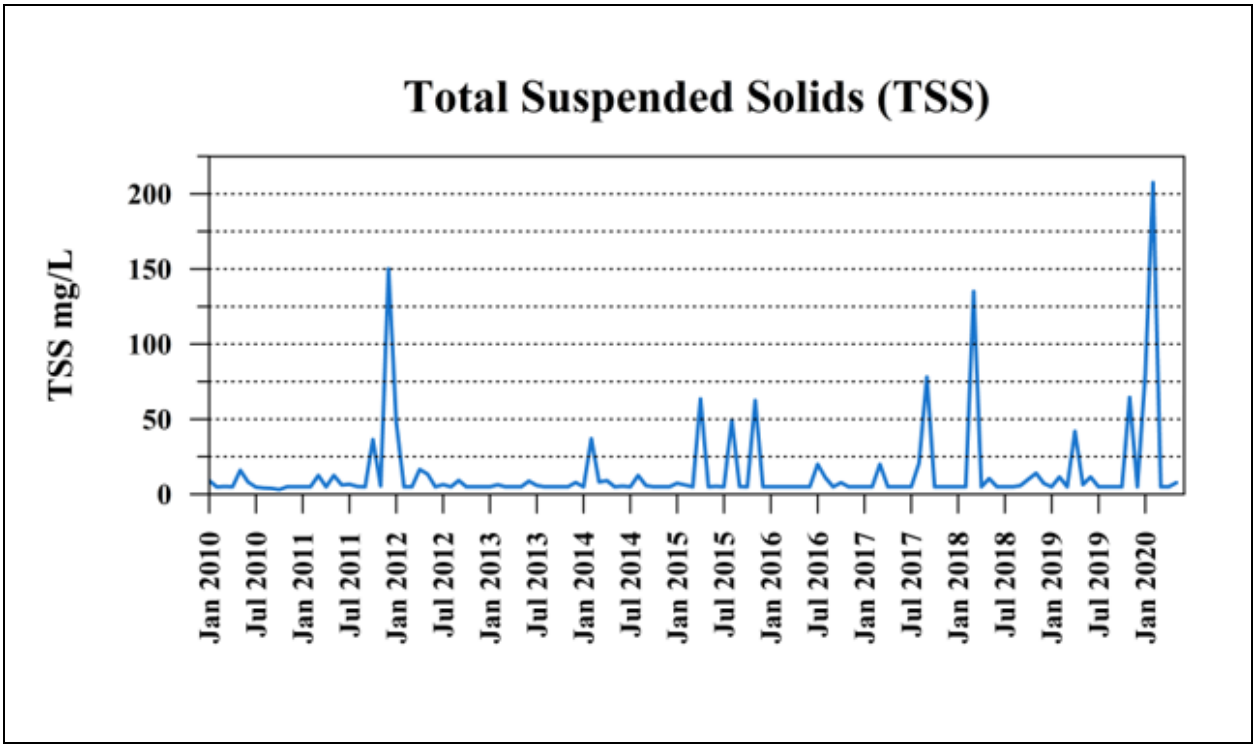
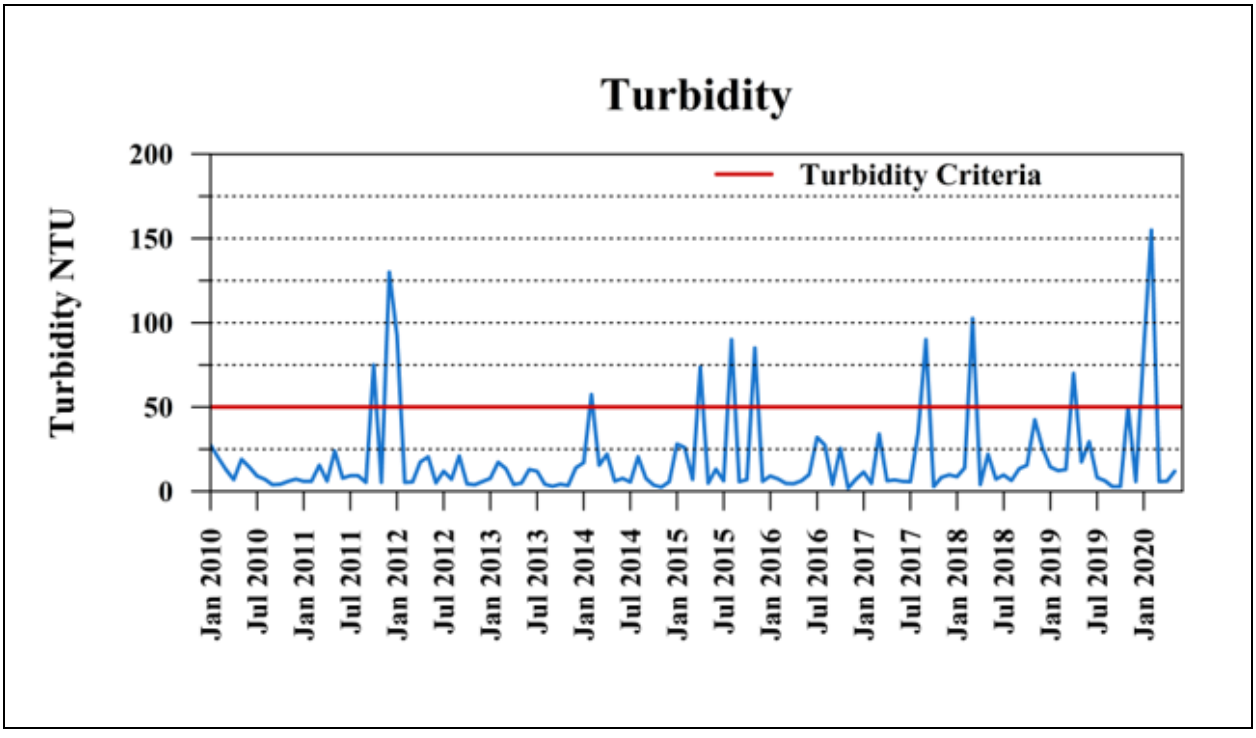

Water Quality
Stream Use-Support Index
CY 2019
No Data
Degraded
Impaired
Partially Supporting
Supporting
Based on:
Fecal Coliform, Metals, Phosphorus, Physical Parameters and Biological / Habitat Monitoring in Charlotte-Mecklenburg
STORM WATER

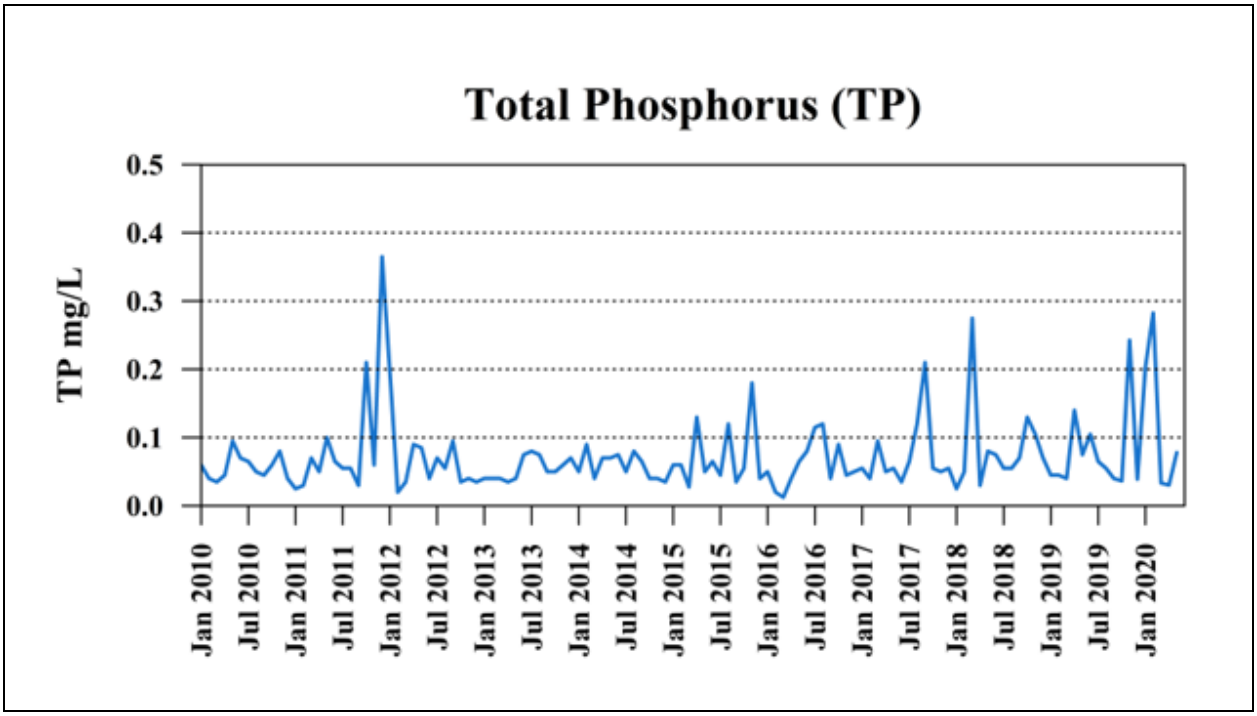
FIGURE 10-3

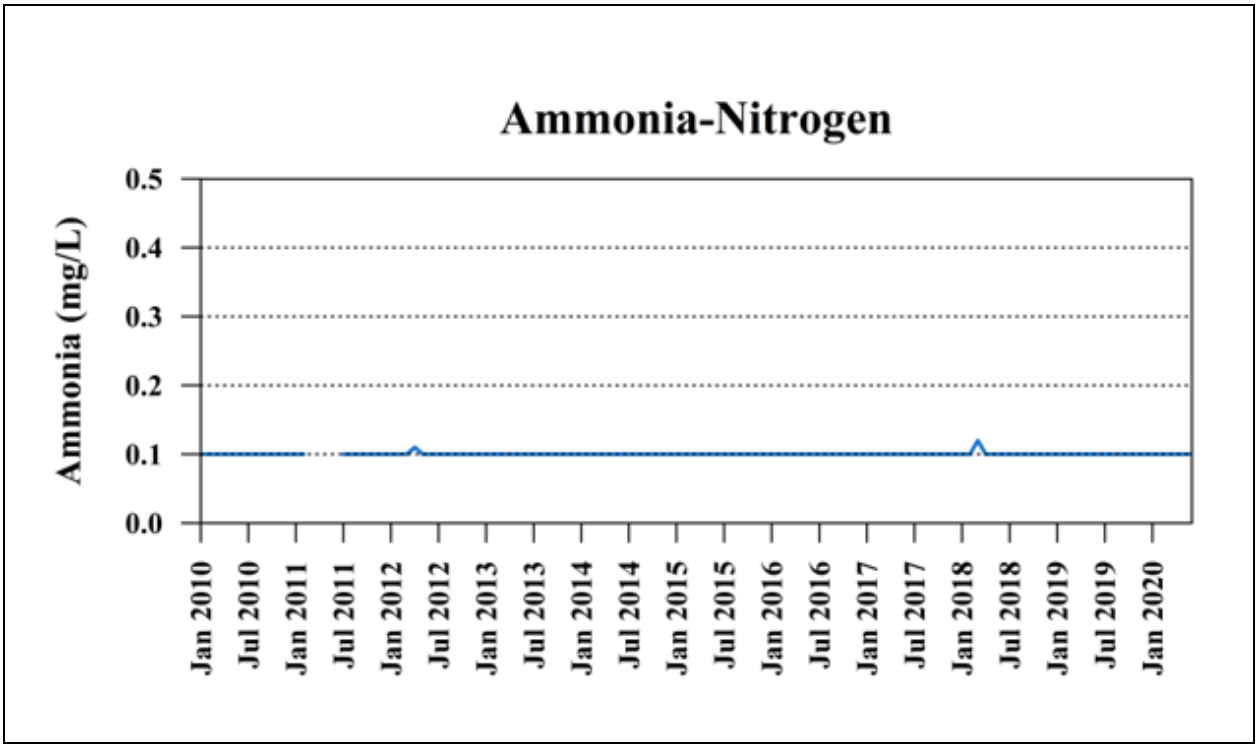

Fecal Coliform
CFU/100 mL
100,000
10,000
1,000
100
10
1
Fecal Coliform Criteria
Jan 2010
Jul 2010
Jan 2011
Jul 2011
Jan 2012
Jul 2012
Jan 2013
Jul 2013
Jan 2014
Jul 2014
Jan 2015
Jul 2015
Jan 2016
Jul 2016
Jan 2017
Jul 2017
Jan 2018
Jul 2018
Jan 2019
Jul 2019
Jan 2020

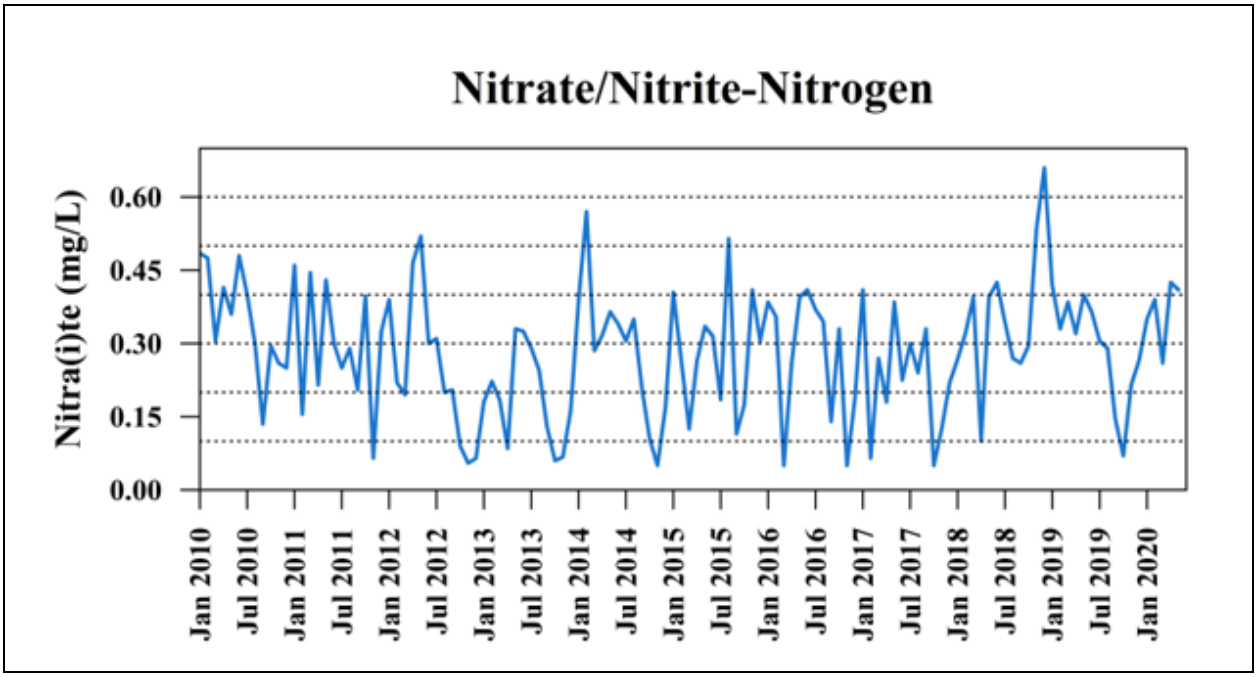

E. Coli
MPN/100 mL
100,000
10,000
1,000
100
10
1
E. Coli Criteria
Jan 2010
Jul 2010
Jan 2011
Jul 2011
Jan 2012
Jul 2012
Jan 2013
Jul 2013
Jan 2014
Jul 2014
Jan 2015
Jul 2015
Jan 2016
Jul 2016
Jan 2017
Jul 2017
Jan 2018
Jul 2018
Jan 2019
Jul 2019
Jan 2020

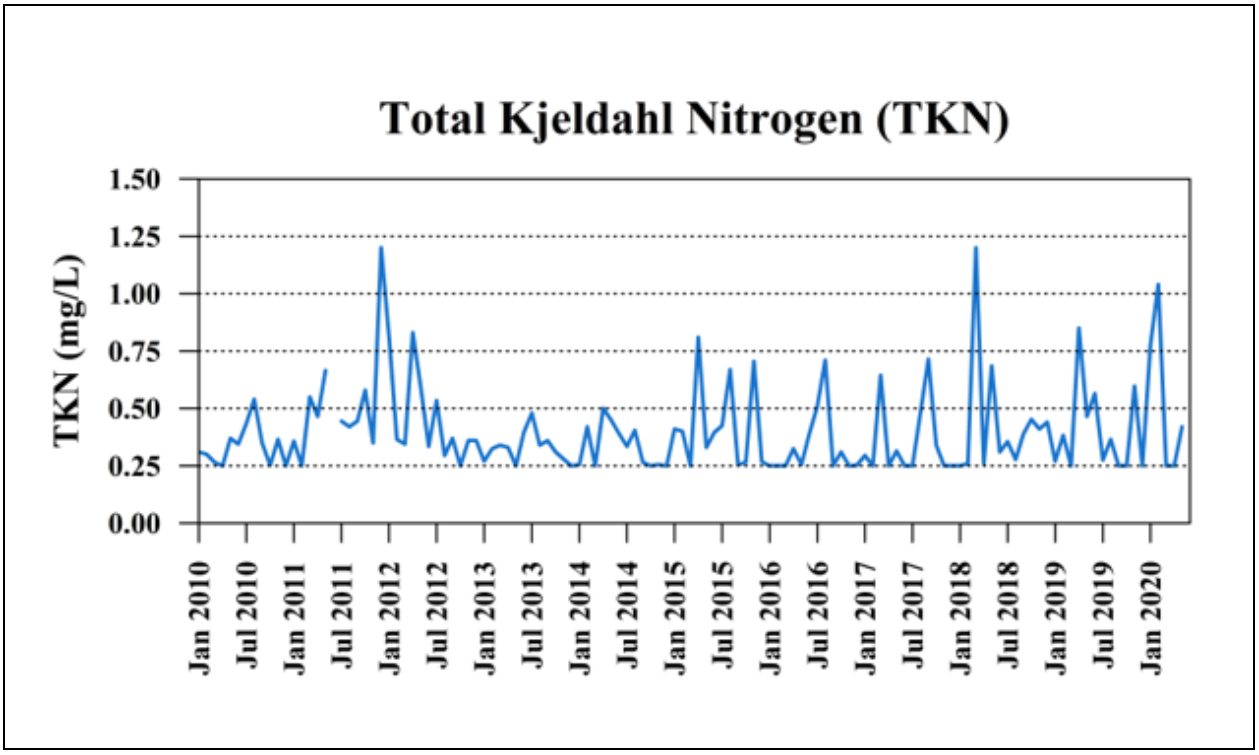

Total Suspended Solids (TSS)
TSS mg/L
200
150
100
50
0
Jan 2010
Jul 2010
Jan 2011
Jul 2011
Jan 2012
Jul 2012
Jan 2013
Jul 2013
Jan 2014
Jul 2014
Jan 2015
Jul 2015
Jan 2016
Jul 2016
Jan 2017
Jul 2017
Jan 2018
Jul 2018
Jan 2019
Jul 2019
Jan 2020

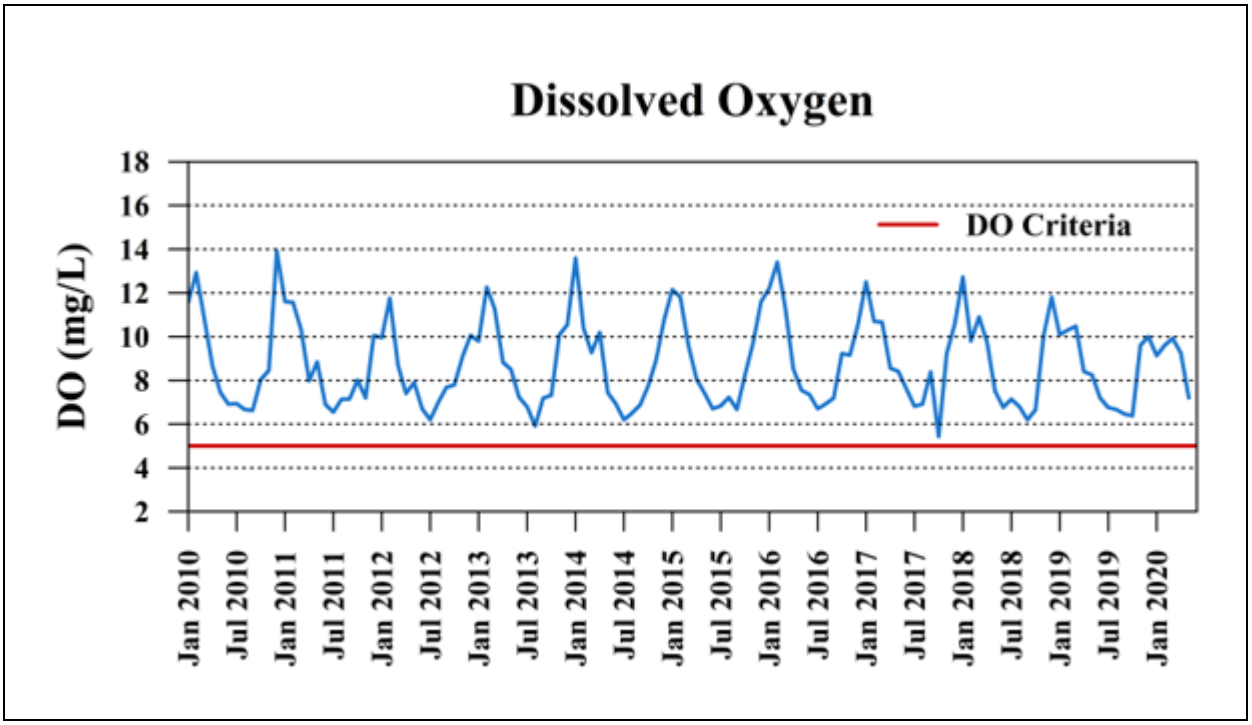

Turbidity
Turbidity NTU
Turbidity Criteria
200
150
100
50
0
Jan 2010
Jul 2010
Jan 2011
Jul 2011
Jan 2012
Jul 2012
Jan 2013
Jul 2013
Jan 2014
Jul 2014
Jan 2015
Jul 2015
Jan 2016
Jul 2016
Jan 2017
Jul 2017
Jan 2018
Jul 2018
Jan 2019
Jul 2019
Jan 2020

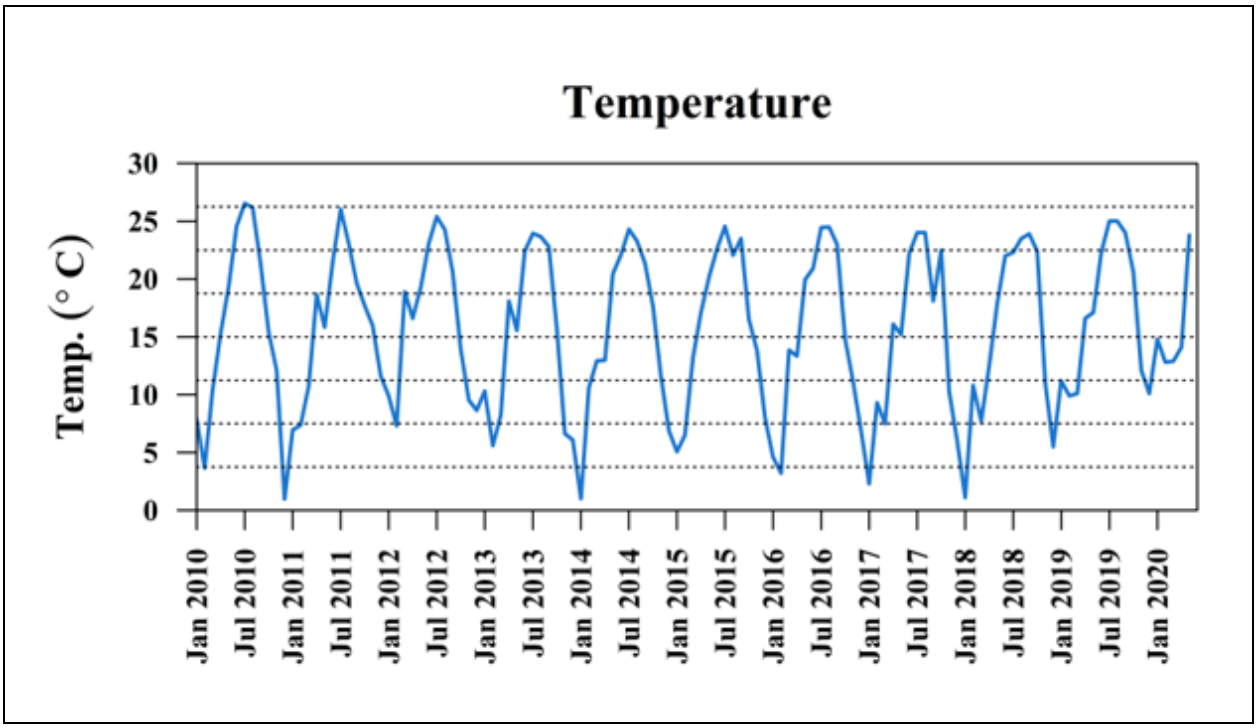

Total Phosphorus (TP)
TP mg/L
0.5
0.4
0.3
0.2
0.1
0.0
Jan 2010
Jul 2010
Jan 2011
Jul 2011
Jan 2012
Jul 2012
Jan 2013
Jul 2013
Jan 2014
Jul 2014
Jan 2015
Jul 2015
Jan 2016
Jul 2016
Jan 2017
Jul 2017
Jan 2018
Jul 2018
Jan 2019
Jul 2019
Jan 2020

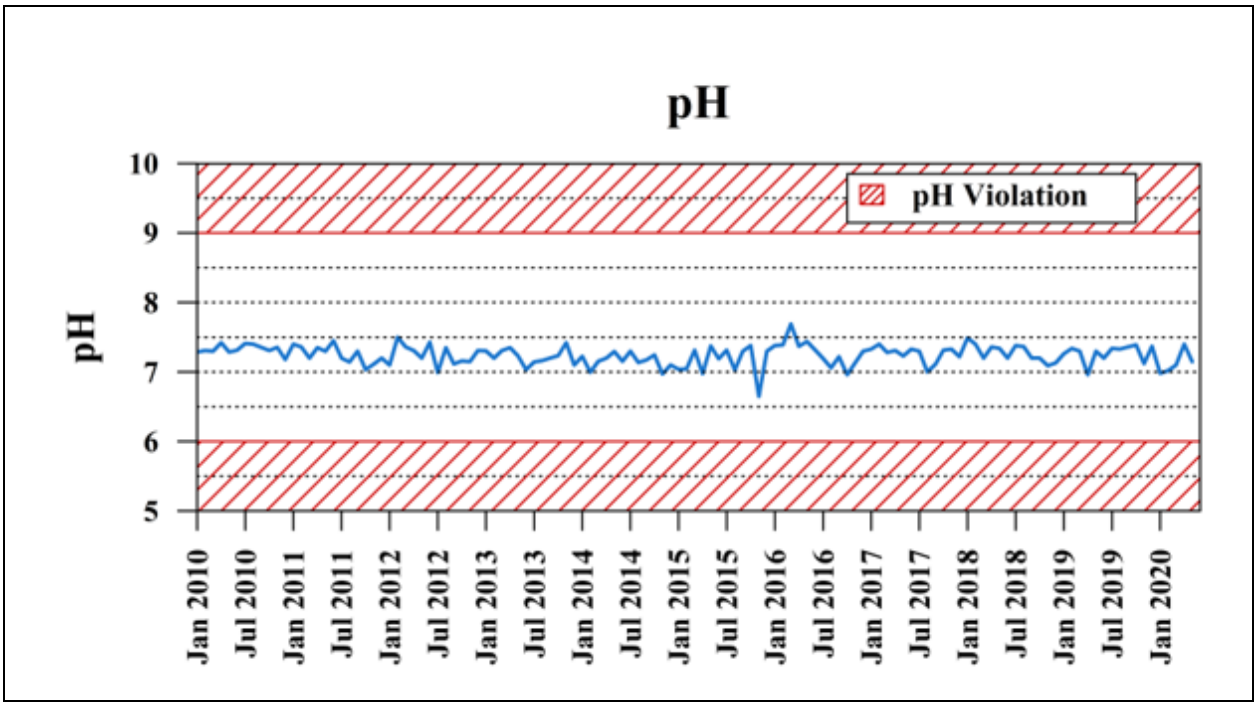

Ammonia-Nitrogen
Ammonia (mg/L)
0.5
0.4
0.3
0.2
0.1
0.0
Jan 2010
Jul 2010
Jan 2011
Jul 2011
Jan 2012
Jul 2012
Jan 2013
Jul 2013
Jan 2014
Jul 2014
Jan 2015
Jul 2015
Jan 2016
Jul 2016
Jan 2017
Jul 2017
Jan 2018
Jul 2018
Jan 2019
Jul 2019
Jan 2020


Nitrate/Nitrite-Nitrogen
Nitra(i)te (mg/L)
0.60
0.45
0.30
0.15
0.00
Jan 2010
Jul 2010
Jan 2011
Jul 2011
Jan 2012
Jul 2012
Jan 2013
Jul 2013
Jan 2014
Jul 2014
Jan 2015
Jul 2015
Jan 2016
Jul 2016
Jan 2017
Jul 2017
Jan 2018
Jul 2018
Jan 2019
Jul 2019
Jan 2020


Total Kjeldahl Nitrogen (TKN)
TKN (mg/L)
1.50
1.25
1.00
0.75
0.50
0.25
0.00
Jan 2010
Jul 2010
Jan 2011
Jul 2011
Jan 2012
Jul 2012
Jan 2013
Jul 2013
Jan 2014
Jul 2014
Jan 2015
Jul 2015
Jan 2016
Jul 2016
Jan 2017
Jul 2017
Jan 2018
Jul 2018
Jan 2019
Jul 2019
Jan 2020


Dissolved Oxygen
DO (mg/L)
18
16
14
12
10
8
6
4
2
DO Criteria
Jan 2010
Jul 2010
Jan 2011
Jul 2011
Jan 2012
Jul 2012
Jan 2013
Jul 2013
Jan 2014
Jul 2014
Jan 2015
Jul 2015
Jan 2016
Jul 2016
Jan 2017
Jul 2017
Jan 2018
Jul 2018
Jan 2019
Jul 2019
Jan 2020


Temperature
Temp. (° C)
30
25
20
15
10
5
0
Jan 2010
Jul 2010
Jan 2011
Jul 2011
Jan 2012
Jul 2012
Jan 2013
Jul 2013
Jan 2014
Jul 2014
Jan 2015
Jul 2015
Jan 2016
Jul 2016
Jan 2017
Jul 2017
Jan 2018
Jul 2018
Jan 2019
Jul 2019
Jan 2020


pH
pH Violation
pH
10
9
8
7
6
5
Jan 2010
Jul 2010
Jan 2011
Jul 2011
Jan 2012
Jul 2012
Jan 2013
Jul 2013
Jan 2014
Jul 2014
Jan 2015
Jul 2015
Jan 2016
Jul 2016
Jan 2017
Jul 2017
Jan 2018
Jul 2018
Jan 2019
Jul 2019
Jan 2020

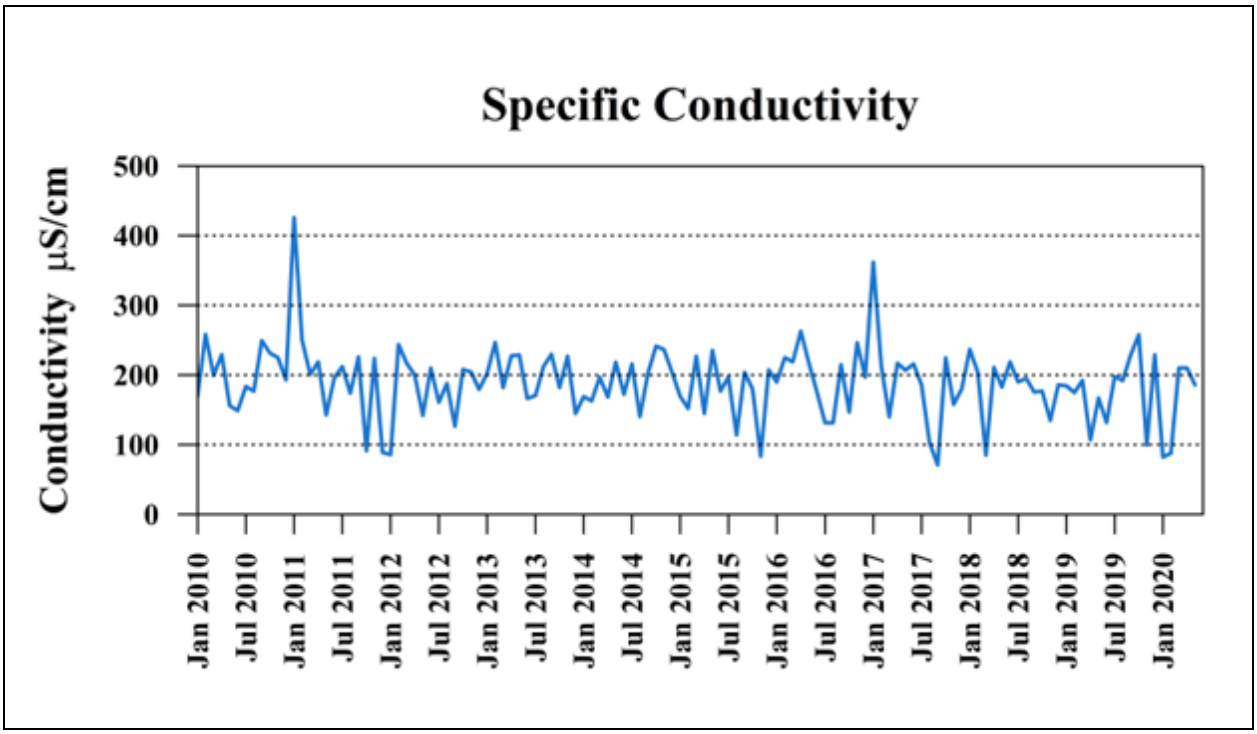
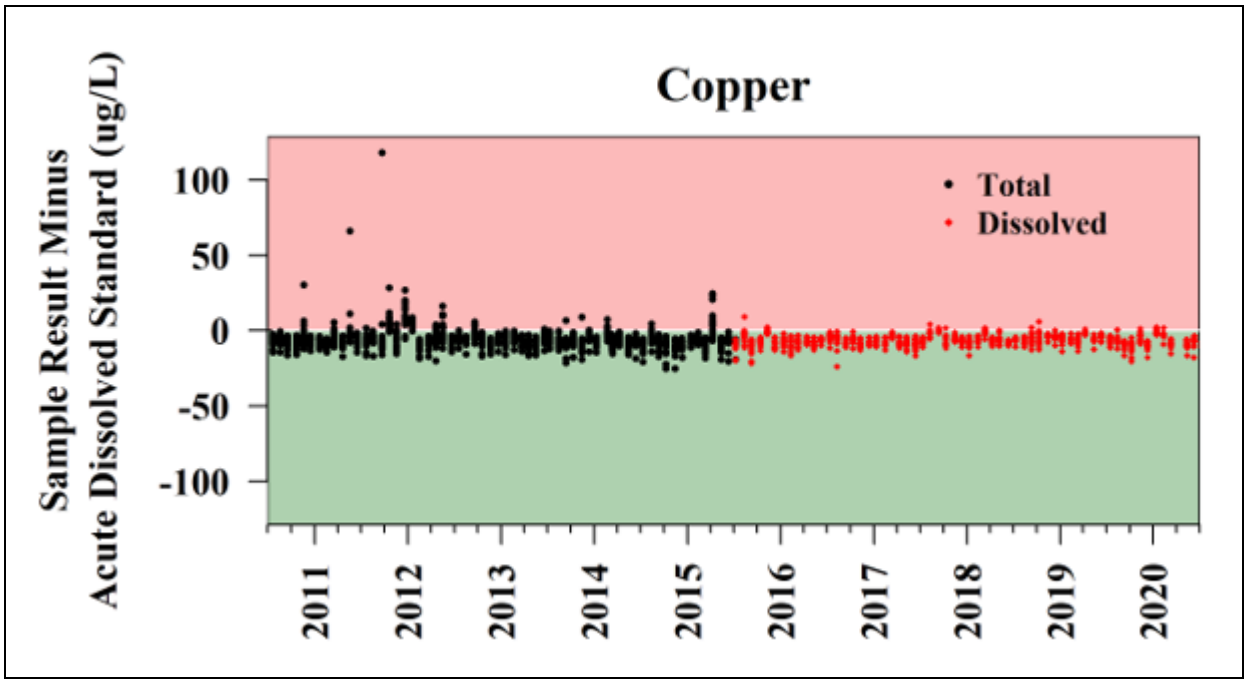
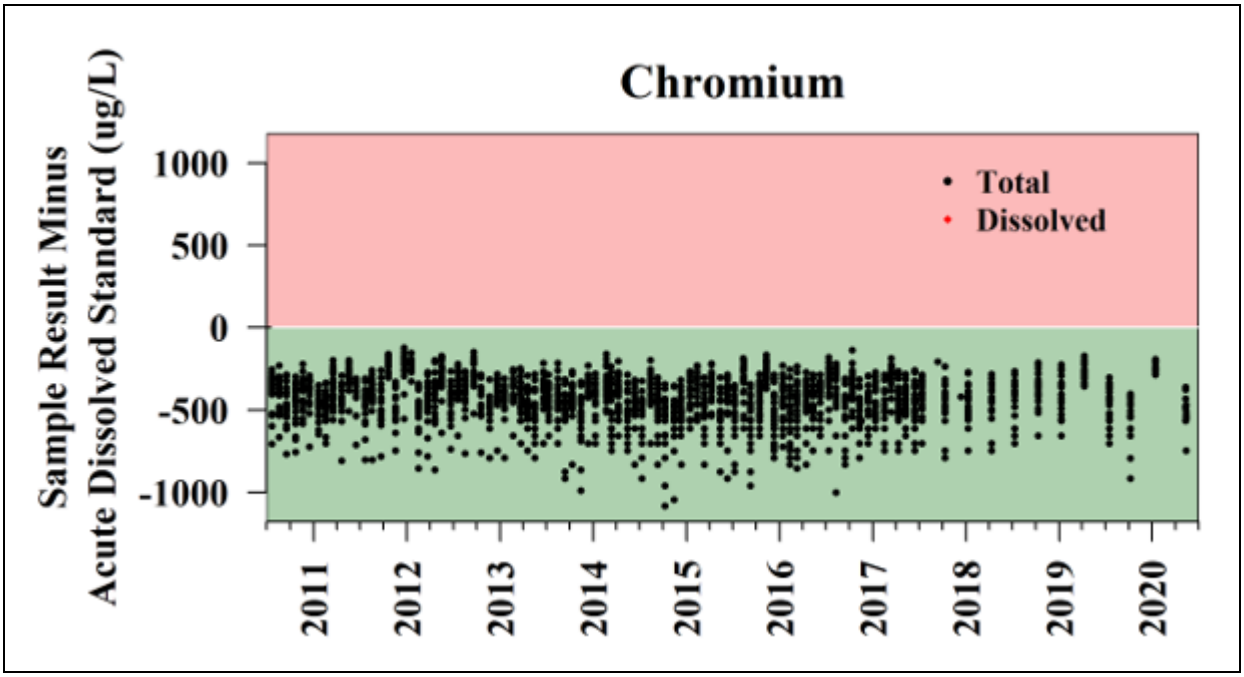


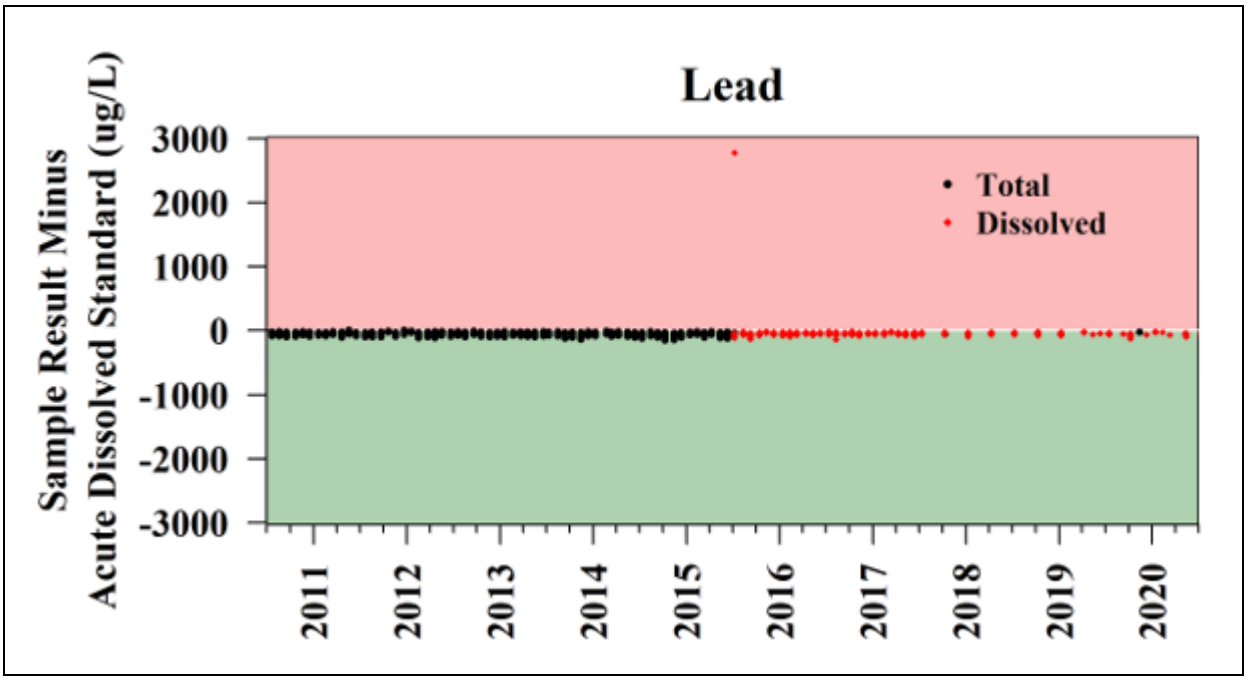
Figure 10-4 shows data for the metals included in the monitoring plan for the period of July 2010 through June 2020. These data have been plotted as the difference between individual sample results and the acute dissolved standard at the sample's hardness value to better illustrate exceedances and non-exceedances on a temporal basis. As a result, the vertical axes represent how far above or below the standard a given sample was, as opposed to showing absolute sample concentrations. Samples collected prior to implementation of the dissolved metals standards are also shown relative to the current dissolved metals standards, as this gives a better picture of historical toxicity.

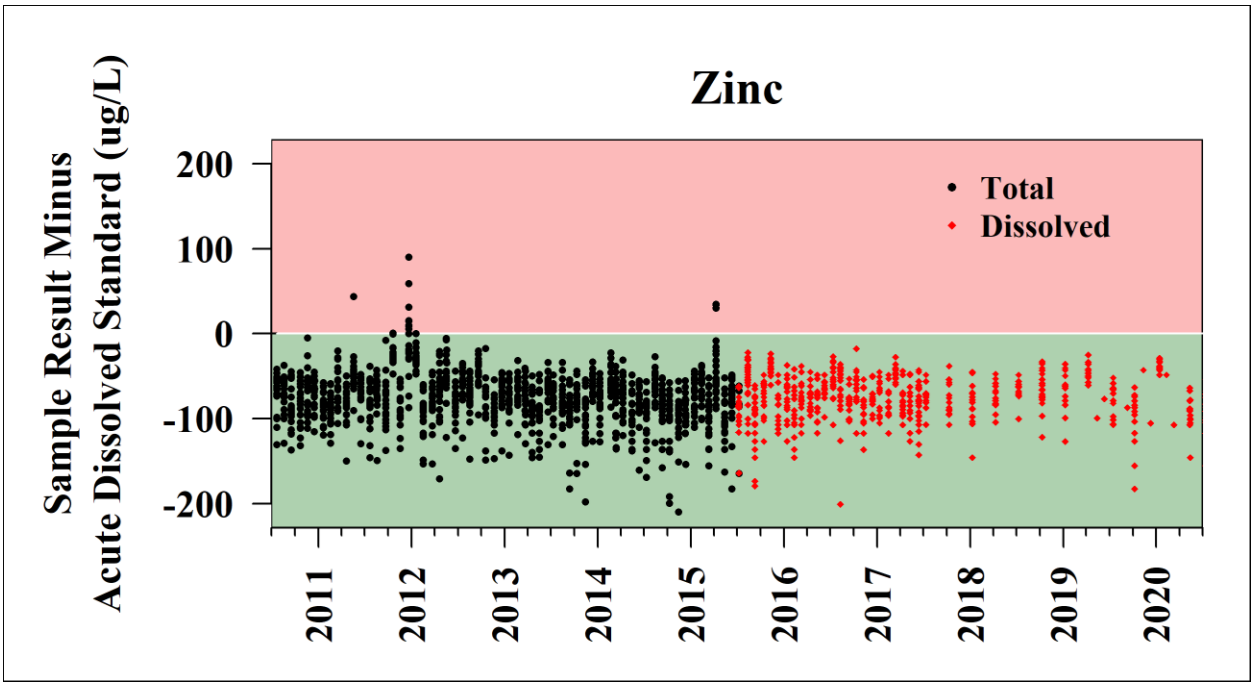
The City has analyzed fixed interval samples for dissolved copper, dissolved lead, and dissolved zinc since July 2015, given that, historically, total metals samples of those elements have exceeded the new dissolved metals standards at least once. For chromium, which has never exceeded the total metal standard or the more protective dissolved standard, the City continues to analyze on a total basis. It can be seen from **Figure 10-4** that copper is the only metal for which the dissolved standard has been exceeded at any sites since coming into effect in 2015.

FIGURE 10-4


Copper
Sample Result Minus
Acute Dissolved Standard (ug/L)
100
50
0
-50
-100
Total
Dissolved
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020


Chromium
Sample Result Minus Acute Dissolved Standard (ug/L)
1000
500
0
-500
-1000
Total
Dissolved
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020


Lead
Sample Result Minus Acute Dissolved Standard (ug/L)
3000
2000
1000
0
-1000
-2000
-3000
Total
Dissolved
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020



Section 11: Total Maximum Daily Load (TMDL) Program

The City continued to fulfill the NPDES MS4 permit requirements regarding the TMDL Program by implementing the following BMPs within the six minimum NPDES MS4 permit measures. The BMPs are designed to reduce the TMDL pollutant of concern within the TMDL assigned MS4 NPDES regulated waste load allocation to the maximum extent practicable (MEP) within the impaired water bodies in the City's jurisdiction that are subject to approved TMDLs. The following sub-sections explain:

- The BMPs implemented to meet program requirements;
- Measures of success;
- Future goals and planned activities; and
- Program assessment.

11.1 BMP Summary Table

Table 11-1 provides information concerning the BMPs implemented to fulfill the Total Maximum Daily Load (TMDL) Program requirements. These BMPs pertain to the City's existing TMDL watershed plan that was developed under the City's previous NPDES MS4 permit.

Table 11-1: BMP Summary Table for Total Maximum Daily Load (TMDL) Program.

BMP	BMP Description	Schedule (years)					Responsible Position
		1	2	3	4	5	
Identify, describe and map watershed, outfalls, and streams	Within 24 months the permittee shall prepare a plan that: • Identifies the watershed(s) subject to an approved TMDL with an approved Waste Load Allocation (WLAs) assigned to the permittee, • Includes a description of the watershed(s), • Includes a map of watershed(s) showing streams & outfalls • Identifies the locations of currently known major outfalls within its corporate limits with the potential of contributing to the cause(s) of the impairment to the impaired segments, to their tributaries, and to segments and tributaries within the watershed contributing to the impaired segments and • Includes a schedule to discover and locate other major outfalls within its corporate limits that may be contributing to the cause of the impairment to the impaired stream segments, to their tributaries, and to segments and tributaries within the watershed contributing to the impaired segments.	X	X	X	X	X	Water Quality Program Manager
Existing measures	Within 24 months the Permittee's plan: • Shall describe existing measures being implemented by the Permittee designed to achieve the MS4's NPDES WLA and to reduce the TMDL pollutant of concern to the MEP within the watershed to which the TMDL applies; and • Provide an explanation as to how those measures are designed to reduce the TMDL pollutant of concern. • The Permittee shall continue to implement the existing measures until notified by DWQ.	X	X	X	X	X	Water Quality Program Manager
Assessment of available monitoring data	Within 24 months the permittee's plan shall include an assessment of available monitoring data. Where long-term data is available, this assessment should include an analysis of the data to show trends.	X	X	X	X	X	Water Quality Program Manager
Monitoring Plan	Within 36 months the permittee shall develop and submit to the Division a Monitoring Plan for the permittee's assigned NPDES regulated WLA as specified in the TMDL. The permittee shall maintain and implement the Monitoring Plan as additional outfalls are identified and as accumulating data may suggest. Following any review and comment by the Division the permittee shall incorporate any necessary changes to monitoring plan and initiate the plan within six months. Modifications to the monitoring plan shall be approved by the Division. Upon request, the requirement to develop a	X	X	X	X	X	Water Quality Program Manager

	Monitoring Plan may be waived by the Division if the existing and proposed measures are determined to be adequate to achieve the MS4's NPDES WLA to MEP within the watershed to which the TMDL applies.						
Additional Measures	Within 36 months the permittee's plan shall: • Describe additional measures to be implemented by the permittee designed to achieve the permittee's MS4's NPDES WLA and to reduce the TMDL pollutant of concern to the MEP within the watershed to which the TMDL applies; and • Provide an explanation as to how those measures are designed to achieve the permittee's MS4's NPDES regulated WLA to the MEP within the watershed to which the TMDL applies.	X	X	X	X	X	Water Quality Program Manager
Implementation Plan	Within 48 months the permittee's plan shall: • Describe the measures to be implemented within the remainder of the permit term designed to achieve the MS4's NPDES WLA and to reduce the TMDL pollutant of concern to the MEP and • Identify a schedule, subject to DWQ approval, for completing the activities.	X	X	X	X	X	Water Quality Program Manager
Incremental Success	The permittee's plan must outline ways to track and report successes designed to achieve the MS4's NPDES regulated WLA and to reduce the TMDL pollutant of concern to MEP within the watershed to which the TMDL applies.	X	X	X	X	X	Water Quality Program Manager
Reporting	The permittee shall conduct and submit to the Division an annual assessment of the program designed to achieve the MS4's NPDES WLA and to reduce the TMDL pollutant of concern to the MEP within the watershed to which the TMDL applies. Any monitoring data and information generated from the previous year are to be submitted with each annual report.	X	X	X	X	X	Water Quality Program Manager

11.2 TMDL Watershed Plan

The City developed a TMDL watershed plan during February 2015 for the applicable identified watersheds that are subject to an approved TMDL within the City's jurisdiction as defined in Part II, Sec J.1 and J.2 within the City's current NPDES MS4 permit. The plan utilizes BMPs as outlined in the permit within the six minimum NPDES MS4 permit measures that are designed to reduce the TMDL pollutant of concern within the TMDL assigned MS4 NPDES regulated waste load allocation to the MEP. In addition, per Part II, Sec J.3 within the City's current NPDES MS4 permit, the plan addresses the pollutant of concern for approved TMDLs that do not assign a waste load allocation for the pollutant of concern to the municipal stormwater system by evaluating strategies and tailoring BMPs within the scope of the six minimum permit measures

to address the pollutant of concern to the MEP in the watershed(s) to which the TMDL applies. The plan is available for review on the City's website: http://charlottenc.gov/StormWater/SurfaceWaterQuality/Documents/CLT%20NPDES%20MS4%20TMDL%20Watershed%20Plan%20Updates%20-%20Feb%202017%20-%20FINAL.pdf

11.2.1 TMDL Watershed Identification

Section 303(d) of the federal Clean Water Act requires States to identify and establish a priority ranking for water bodies that do not meet applicable surface water quality standards (303(d) list), establish TMDLs for the pollutants causing impairment of these water bodies, and submit the list of impaired waters and TMDLs to the USEPA. The TMDL process establishes the allowable loadings of pollutants or other quantifiable parameters for a water body based on the relationship between pollution sources and in-stream surface water quality conditions. The TMDL process is used by States to establish surface water quality-based controls to reduce pollutants from point and non-point sources and restore and maintain the quality of the water resources in compliance with applicable standards. In addition to the 303(d) list, the federal Clean Water Act requires States to submit a report describing how well water bodies support designated uses (e.g., swimming, aquatic life support, water supply), as well as likely causes and potential sources of impairment (305(b) list).

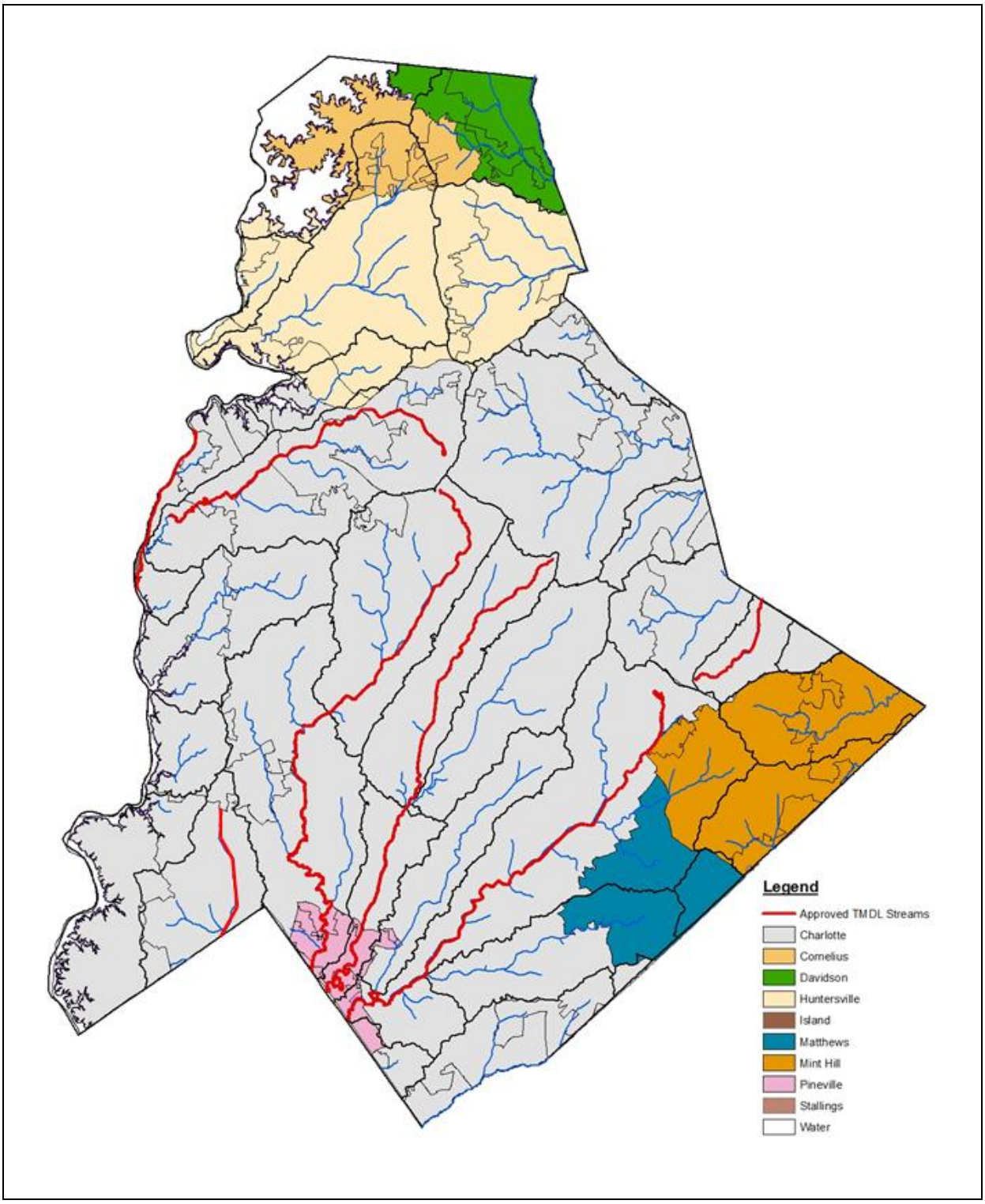
As part of the TMDL watershed plan development, the City reviewed the NCDEQ website to determine which TMDLs were in place within the City's jurisdiction. Currently, there are seven approved TMDLs applicable to multiple streams in the City, some of which also include portions of Mecklenburg County. **Table 11-2** and **Figure 11-1** provide information on, and a map of, these TMDLs and affected watersheds, respectively. Additional information concerning these TMDLs is provided in the City's TMDL Watershed Plan referenced in section 11.2.

Table 11-2: City of Charlotte Streams with Approved TMDLs

Receiving Stream Name	WQ Classification	TMDL Approved	TMDL Pollutant of Concern
Irwin Creek	C	February 1996	Dissolved Oxygen
Little Sugar Creek	C	February 1996	Dissolved Oxygen
McAlpine Creek	C	February 1996	Dissolved Oxygen
Lake Wylie	WS-IV, B, CA	February 1996	Chlorophyll-a
Irwin Creek	C	March 2002	Fecal Coliform
Little Sugar Creek	C	March 2002	Fecal Coliform
McAlpine Creek	C	March 2002	Fecal Coliform
Sugar Creek	C	March 2002	Fecal Coliform
McKee Creek	C	August 2003	Fecal Coliform
Irwin Creek	C	February 2005	Turbidity
Little Sugar Creek	C	February 2005	Turbidity
Long Creek	C	February 2005	Turbidity
McAlpine Creek	C	February 2005	Turbidity
Sugar Creek	C	February 2005	Turbidity
Steele Creek	C	May 2007	Fecal Coliform
Statewide	All	October 2012	Mercury

Source: 2017 NCDEQ – Division of Water Resources website: http://deq.nc.gov/about/divisions/water-resources

FIGURE 11-1
Charlotte Approved TMDL Streams



11.2.2 Outfall Identification for TMDL Watersheds

As part of the development of the TMDL watershed plan the City developed an existing outfall inventory for the applicable TMDL watersheds. This inventory is maintained using a GIS coverage to show existing outfalls within the TMDL watersheds that have the potential of contributing to the cause(s) of the impairment to the impaired segments, to their tributaries, and to segments and tributaries within the watershed contributing to the impaired segments. Additional information on the outfall inventory is provided in the City's TMDL Watershed Plan referenced in section 11.2.

11.3 Identification of Existing Measures

As part of the development of the TMDL watershed plan the City identified existing programs and measures which are currently in use within the City's NPDES MS4 permit and surface water quality monitoring programs that are designed to address the assigned MS4 NPDES regulated waste load allocation ("WLA") and to reduce the TMDL pollutant of concern to the MEP within the watershed to which the TMDL applies. Additional information on the existing measures is provided in the City's TMDL Watershed Plan referenced in section 11.2.

11.4 Assessment of Available Monitoring Data

Fixed interval surface water quality data collected from 2006 through 2020 was analyzed for all applicable TMDL watersheds and pollutants of concern in the City and County. These data help to illustrate surface water quality trends in relation to the NC surface water quality standards. The City's current NPDES MS4 permit, effective October 10, 2018, states that the "The permittee is not responsible for attaining water quality standards ("WQS"). The Division expects attaining WQS will only be achieved through reduction from all point and nonpoint source contributors identified in the approved TMDL." It is infeasible to monitor every MS4 stormwater outfall to determine how progress is being made toward achieving MS4 NPDES WLAs; therefore, the City utilizes fixed interval surface water data to investigate surface water quality trends. The data presented below, while illustrating how in-stream surface water quality has changed over time, unfortunately are not able to distinguish MS4 contributions from other point and nonpoint sources that are not under the control of the MS4. Consequently, increases in surface water contaminants observed in the data do not necessarily indicate that MS4 contributions are also increasing.

11.4.1 Fecal Coliform

Data from the six watersheds listed as being subject to fecal coliform TMDLs in **Table 11-2** are discussed in this sub-section. Of the six watersheds listed in **Table 11-2**, a MS4 NPDES WLA was only developed for McKee and Steele Creeks. According to Part II, Section J.3 of the City's NPDES MS4 permit, for approved TMDLs where a MS4 NPDES WLA for the pollutant of concern is not assigned to the municipal stormwater system, the Permittee is still required to "evaluate strategies and tailor BMPs within the scope of the six minimum permit measures to

address the pollutant of concern in the watershed(s) to which the TMDL applies." Watersheds with and without MS4 WLAs are discussed in the subsections below.

11.4.1.1 McKee Creek

Fixed interval stream data for fecal coliform was collected at the CMSWS monitoring site MY7B on McKee Creek. A summary of the data collected from July 2006 through June 2020 is provided in **Figure 11-2**. A total of 170 samples have been collected over this period under the fixed interval monitoring program. Of these, 55% exceeded the 400 cfu/100mL State standard with 90% confidence. Exceedances tended to be more frequent and more extreme under wet weather influenced sampling conditions (meaning some precipitation within the County in the 72-hour preceding the sampling event); however, exceedances did occur under both ambient and wet weather influenced conditions.

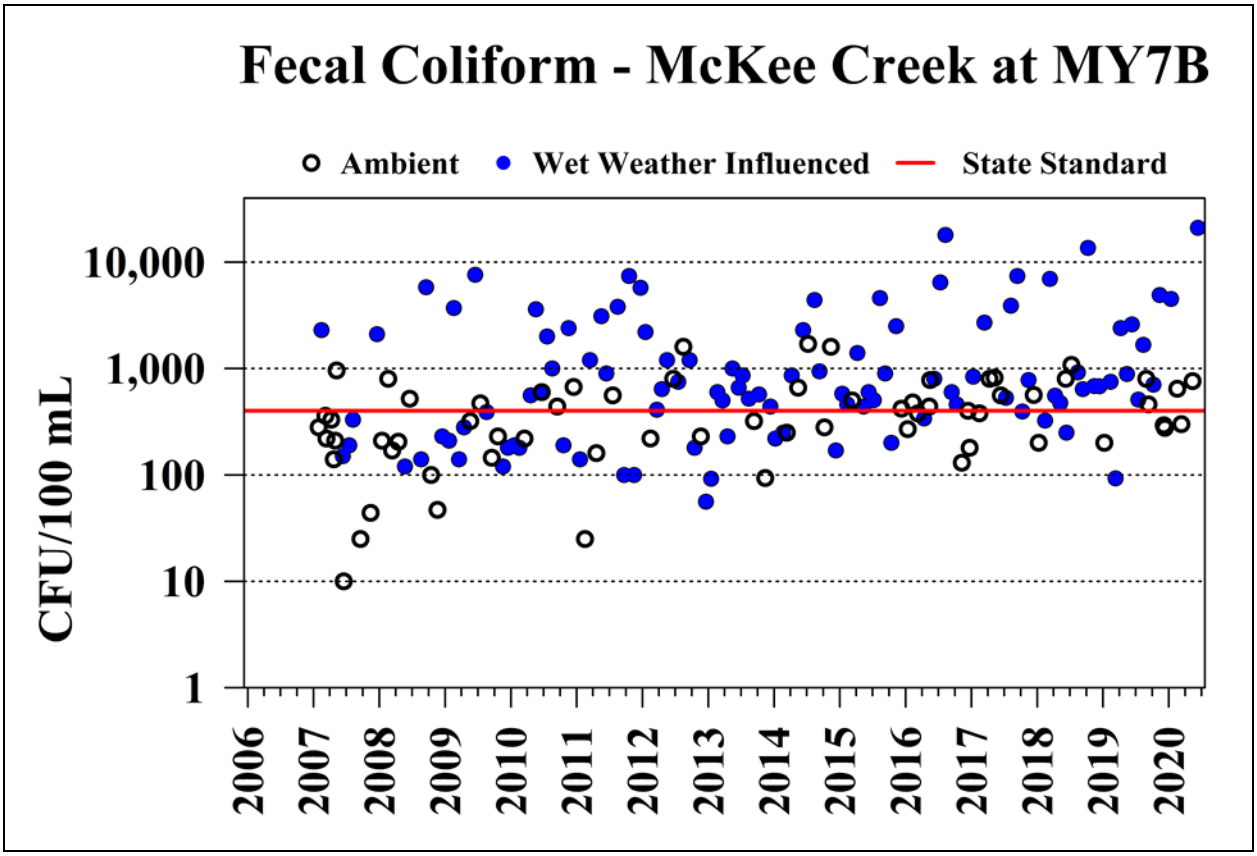


Figure 11-2: McKee Creek –MY7B - Overall Monitoring Data

11.4.1.2 Steele Creek Watershed

Fixed interval stream data for fecal coliform were collected at the CMSWS monitoring site MC47A on Steele Creek. A summary of the data collected from July 2006 through June 2020 is provided in **Figure 11-3**. A total of 181 samples have been collected over this period under the fixed interval monitoring program. Of these, 52% exceeded the 400 cfu/100mL State standard

with 90% confidence. Exceedances tended to be more frequent and more extreme under wet weather influenced sampling conditions (meaning some precipitation within the County in the 72-hour preceding the sampling event); however, exceedances did occur under both ambient and wet weather influenced conditions.

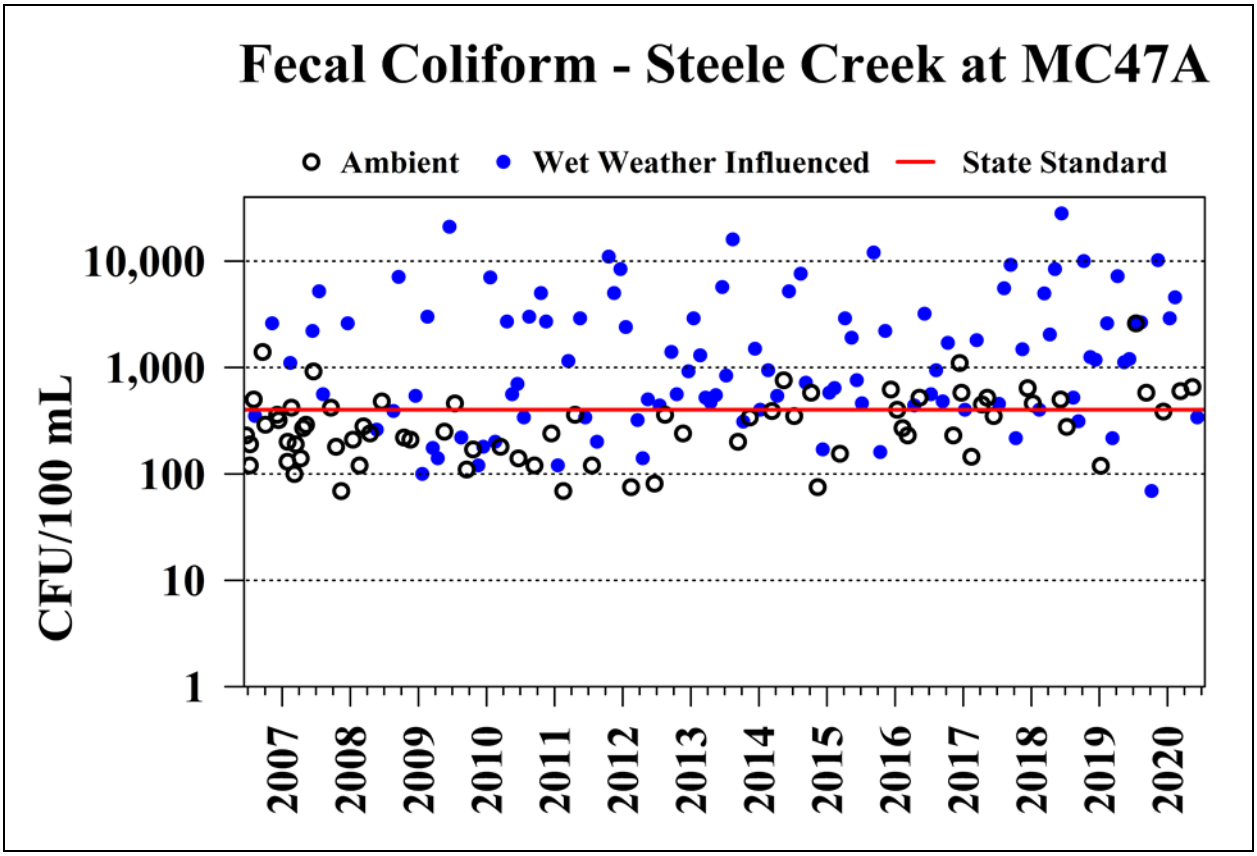


Figure 11-3: Steele Creek –MC47A - Overall Monitoring Data

11.4.1.3 Sugar/Irwin Creek Watershed

There are two fixed interval monitoring locations in the Sugar Creek watershed, MC27 in southern Mecklenburg County, and MC22A on Irwin Creek just before its confluence with Sugar Creek. An assessment of available watershed and surface water quality data was conducted utilizing fixed interval stream data for fecal coliform collected at these two monitoring locations. A summary of the data collected from July 2006 through June 2020 is provided in **Figures 11-4 and 11-5**.

A total of 176 samples have been collected at MC27 over this period under the fixed interval monitoring program. Of these, 43% exceeded the 400 cfu/100mL State standard with 90% confidence. Exceedances tended to be more frequent and more extreme under wet weather influenced sampling conditions (meaning some precipitation within the County in the 72-hour

preceding the sampling event); however, exceedances did occur under both ambient and wet weather influenced conditions.

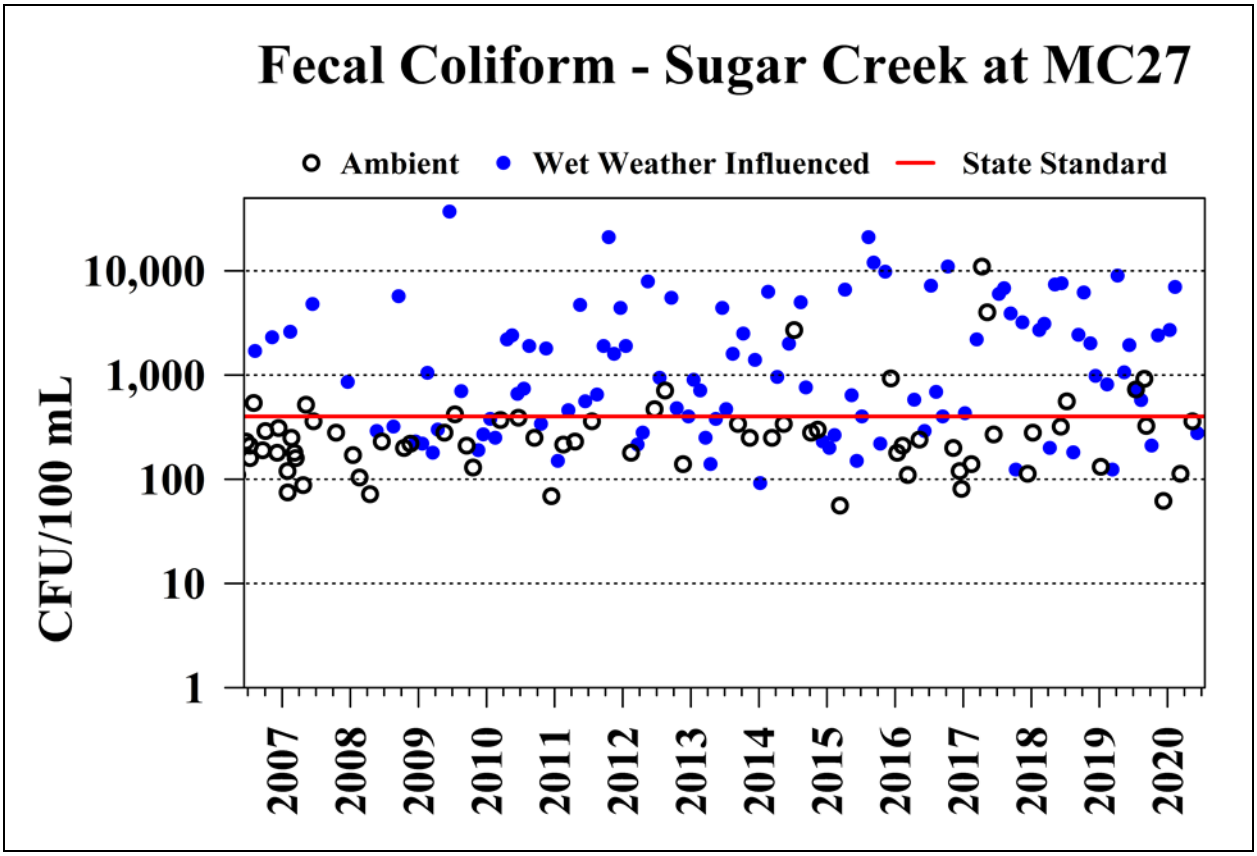


Figure 11-4: Sugar Creek –MC27 - Overall Monitoring Data

During the same period, a total of 172 samples were collected at MC22A under the fixed interval monitoring program. Of these, 43% exceeded the 400 cfu/100mL State standard with 90% confidence. Exceedances tended to be more frequent and more extreme under wet weather influenced sampling conditions (meaning some precipitation within the County in the 72-hour preceding the sampling event); however, exceedances did occur under both ambient and wet weather influenced conditions.

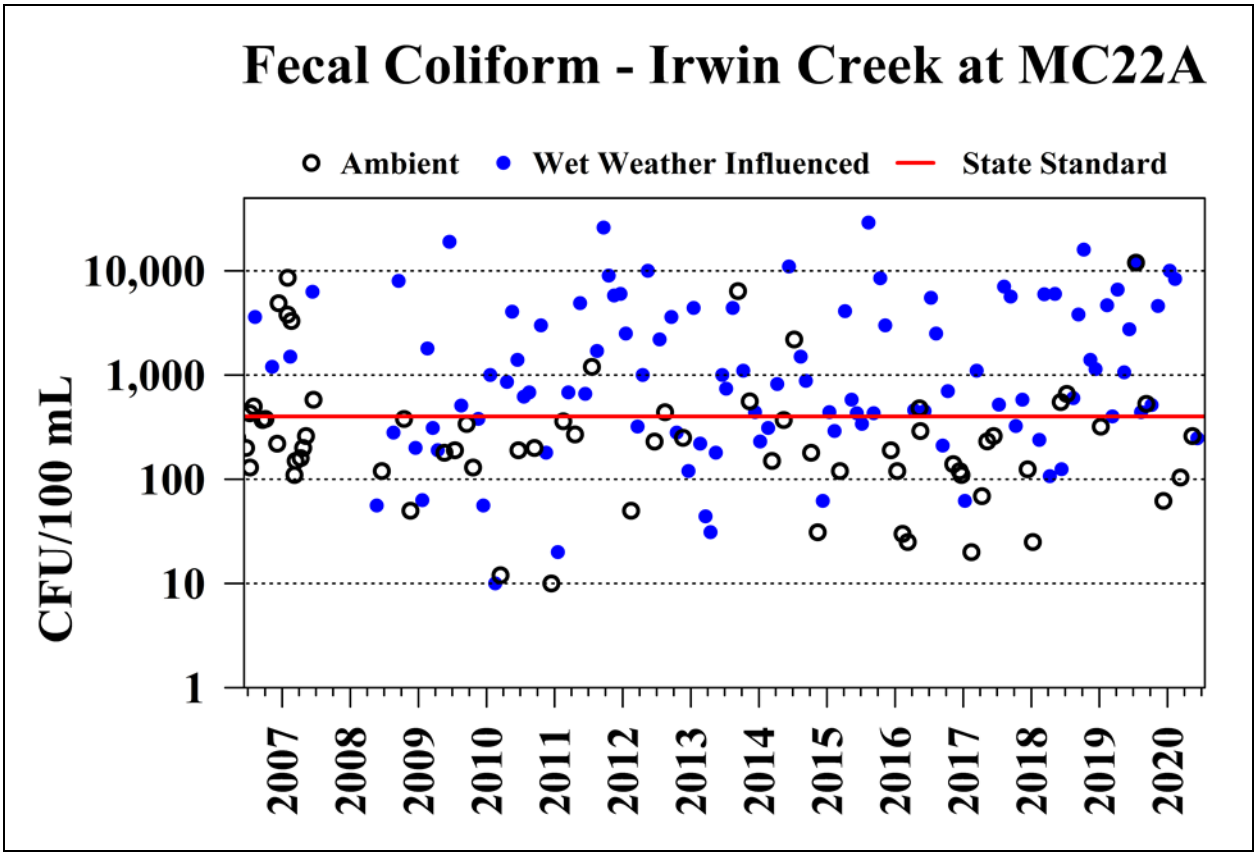


Figure 11-5: Irwin Creek –MC22A - Overall Monitoring Data

11.4.1.4 Little Sugar Creek Watershed

There are two monitoring locations on Little Sugar Creek, MC49A in southern Mecklenburg County just outside the City, and MC29A-1 just downstream of downtown area of the City. An initial assessment of available watershed and surface water quality data was conducted utilizing fixed interval stream data for fecal coliform collected at these two monitoring locations. A summary of the data collected from July 2006 through June 2020 is provided in **Figures 11-6 and 11-7**.

A total of 177 samples have been collected at MC49A over this period under the fixed interval monitoring program. Of these, 52% exceeded the 400 cfu/100mL State standard with 90% confidence. Exceedances tended to be more frequent and more extreme under wet weather influenced sampling conditions (meaning some precipitation within the County in the 72-hour preceding the sampling event); however, exceedances did occur under both ambient and wet weather influenced conditions.

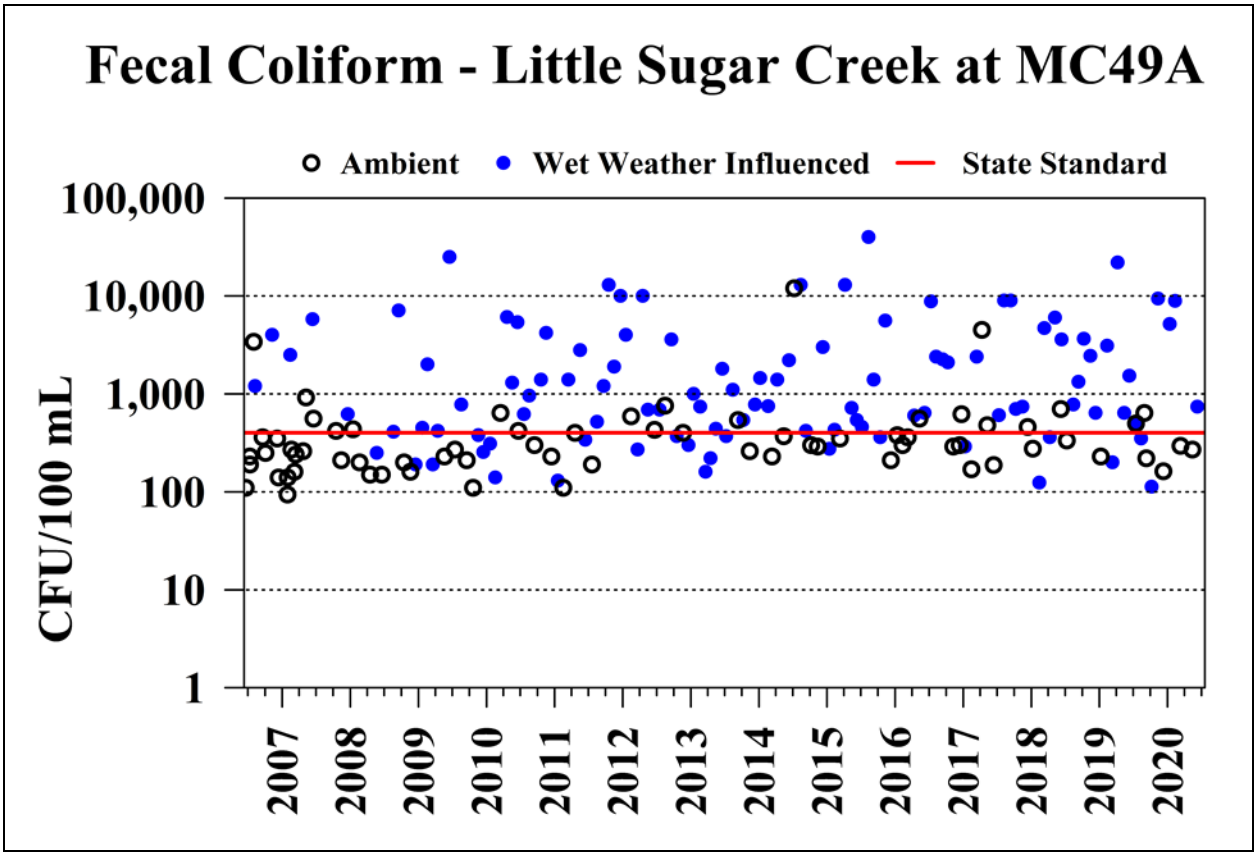


Figure 11-6: Little Sugar Creek –MC49A - Overall Monitoring Data

A total of 184 samples have been collected at MC29A-1 over this period under the fixed interval monitoring program. Of these, 79% exceeded the 400 cfu/100mL State standard with 90% confidence. Exceedances tended to be more frequent and more extreme under wet weather influenced sampling conditions (meaning some precipitation within the County in the 72-hour preceding the sampling event); however, exceedances did occur under both ambient and wet weather influenced conditions.

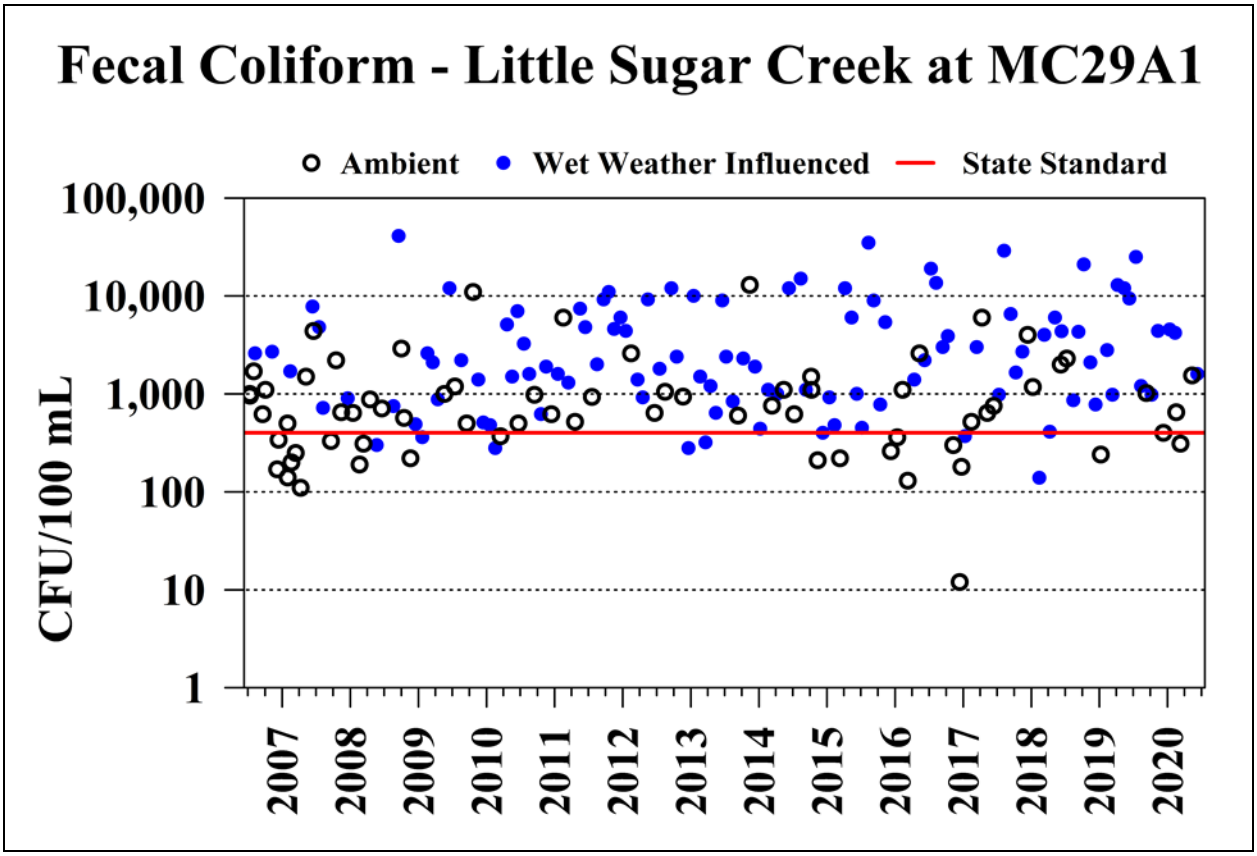


Figure 11-7: Little Sugar Creek –MC29A-1 - Overall Monitoring Data

11.4.1.5 McAlpine Creek Watershed

There are two monitoring locations on McAlpine Creek, MC45B just downstream of the North Carolina/South Carolina border, and MC38 downstream of the confluence with Campbell Creek and Irvins Creek. An initial assessment of available watershed and surface water quality data was conducted utilizing fixed interval stream data for fecal coliform collected at these two monitoring locations. A summary of the data collected from July 2006 through June 2020 is provided in **Figures 11-8 and 11-9**.

A total of 171 samples have been collected at MC45B over this period under the fixed interval monitoring program. Of these, 35% exceeded the 400 cfu/100mL State standard with 90% confidence. Exceedances tended to be much more frequent under wet weather influenced sampling conditions (meaning some precipitation within the County in the 72-hour preceding the sampling event); however, exceedances did occur under both ambient and wet weather influenced conditions.

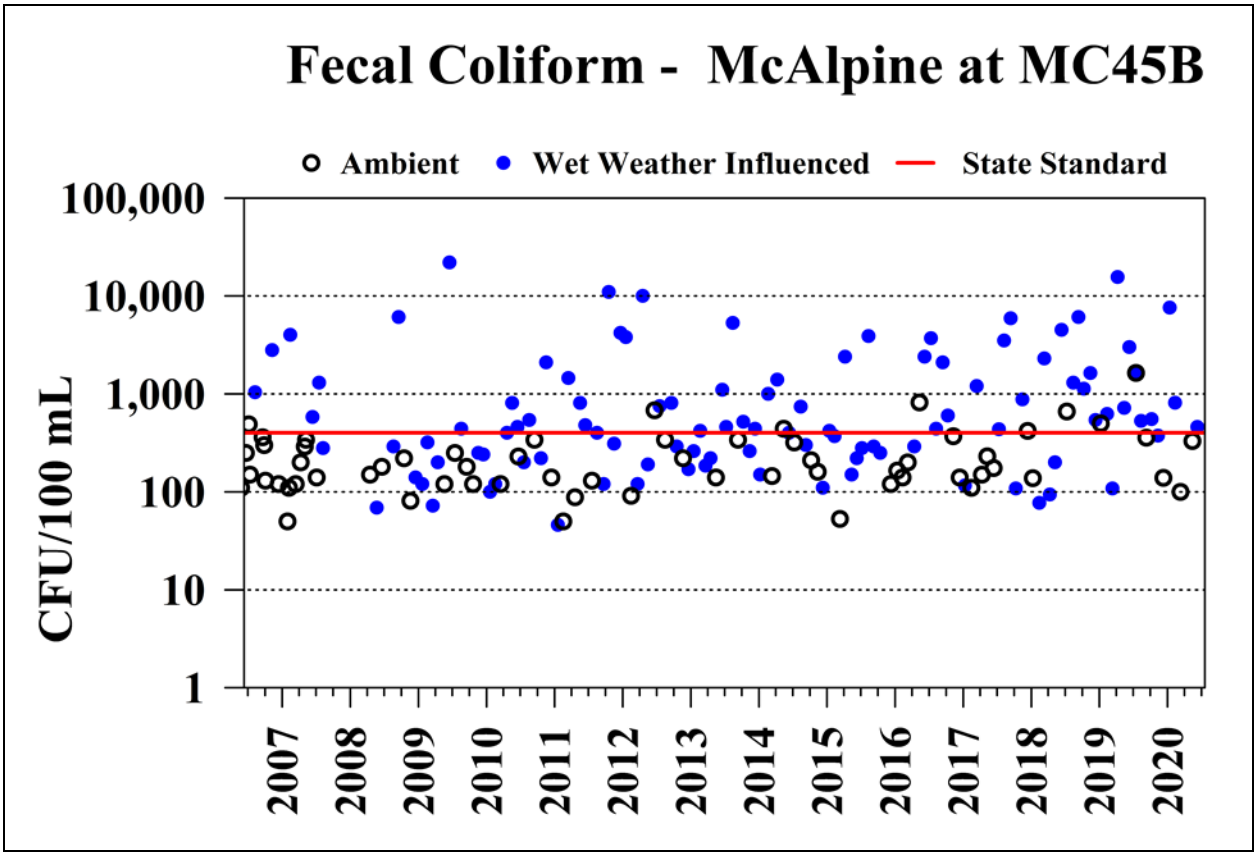


Figure 11-8: McAlpine Creek –MC45B - Overall Monitoring Data

A total of 177 samples have been collected at MC38 over this period under the fixed interval monitoring program (**Figure 11-9**). Of these, 48% exceeded the 400 cfu/100mL State standard with 90% confidence. Exceedances tended to be much more frequent and more extreme under wet weather influenced sampling conditions (meaning some precipitation within the County in the 72-hour preceding the sampling event); however, exceedances did occur under both ambient and wet weather influenced conditions.

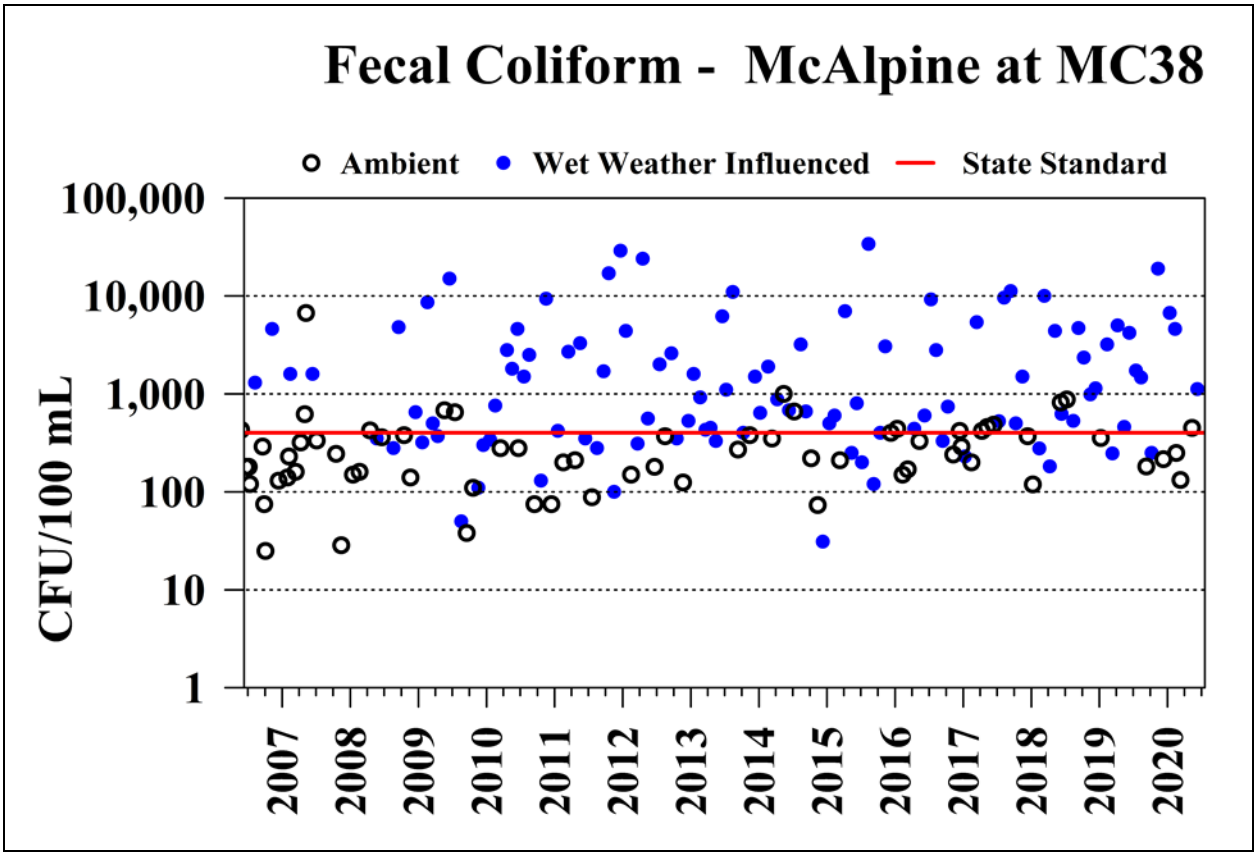


Figure 11-9: McAlpine Creek –MC38 - Overall Monitoring Data

11.4.1.6 Fecal Coliform Summary

The State standard for fecal coliform is exceeded by more than 10% with 90% confidence for all watersheds with a fecal coliform TMDL identified above, based on fixed interval data collected between 2006 and 2020. These exceedances are more common in wet weather influenced conditions, but exceedances also occurred during ambient conditions in each of these watersheds. Since exceedance rates are highly influenced by wet weather, long term variations in the exceedance rates should account for how many samples in a given year are influenced by wet weather conditions. A higher percentage of wet weather events on fixed interval sampling days is expected to result in a higher percentage of samples that exceed surface water quality standards. Since "wet weather" is defined as at least 0.1 inches of rainfall recorded anywhere in the City of Charlotte/Mecklenburg County in the 72 hours prior to sampling, future analysis may also attempt to utilize rain gages in closer proximity to each monitoring station to more accurately verify whether a sample was influenced by wet weather conditions, as rainfall in one part of the City/County does not necessarily mean it is raining everywhere in the City/County.

11.4.2 Turbidity

As discussed in sub-section 11.2, the turbidity TMDL developed in 2005 included five Charlotte-Mecklenburg watersheds but only developed a WLA for turbidity for Long Creek since the surface water quality data assessment performed for the TMDL demonstrated that the remaining four watersheds had less than a 10% exceedance rate of the 50 NTU State standard. Therefore, this sub-section includes an assessment of turbidity data only for Long Creek.

11.4.2.1 Long Creek Watershed

An initial assessment of available watershed and surface water quality data was conducted utilizing stream data for turbidity collected at the CMSWS monitoring site MC14A on Long Creek. A summary of the data collected from January 2010 through June 2020 is provided in **Figure 11-10**. A total of 166 samples were collected during this period, with 17% exceeding the 50 NTU State standard with 90% confidence. These exceedances all occurred under wet weather conditions.

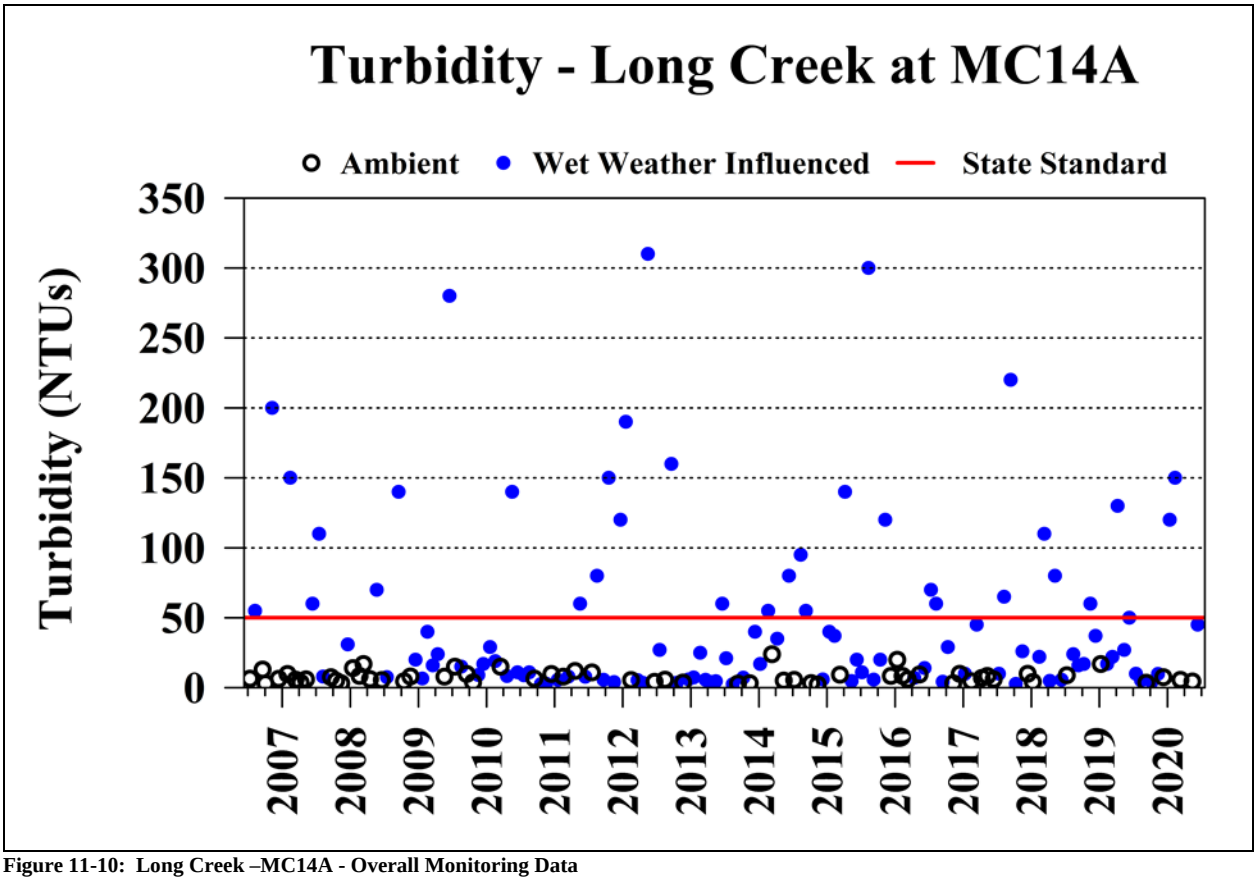


Figure 11-10: Long Creek –MC14A - Overall Monitoring Data

11.4.3 Dissolved Oxygen

As stated in sub-section 11.2, the 1996 dissolved oxygen ("DO") TMDL for Irwin Creek, McAlpine Creek, and Little Sugar Creek did not include a MS4 NPDES WLA. Nevertheless, since the City's NPDES MS4 permit states in Part II, Section J.3, for approved TMDLs where a MS4 NPDES WLA for the pollutant of concern is not assigned to the MS4, the Permittee is still required to "evaluate strategies and tailor BMPs within the scope of the six minimum permit measures to address the pollutant of concern in the watershed(s) to which the TMDL applies." For this reason, the dissolved oxygen data is provided below in **Figures 11-11 through 11-15**.

Unlike the other parameters, for dissolved oxygen the State standard is violated when concentrations go below the standard rather than exceeding the standard. Based on the fixed interval sampling conducted between July 2006 and June 2020, only one sample collected from a TMDL watershed was lower than the instantaneous State standard of 4 mg/L. On October 10, 2017, a value of 3.81 mg/L was recorded at McAlpine Creek (MC38). No other sample violated the standard during this period of record. The 2018 NC Integrated Report categorizes each of these watersheds as 1i for DO, meaning that they have a TMDL but are not impaired and are supporting their designated uses.

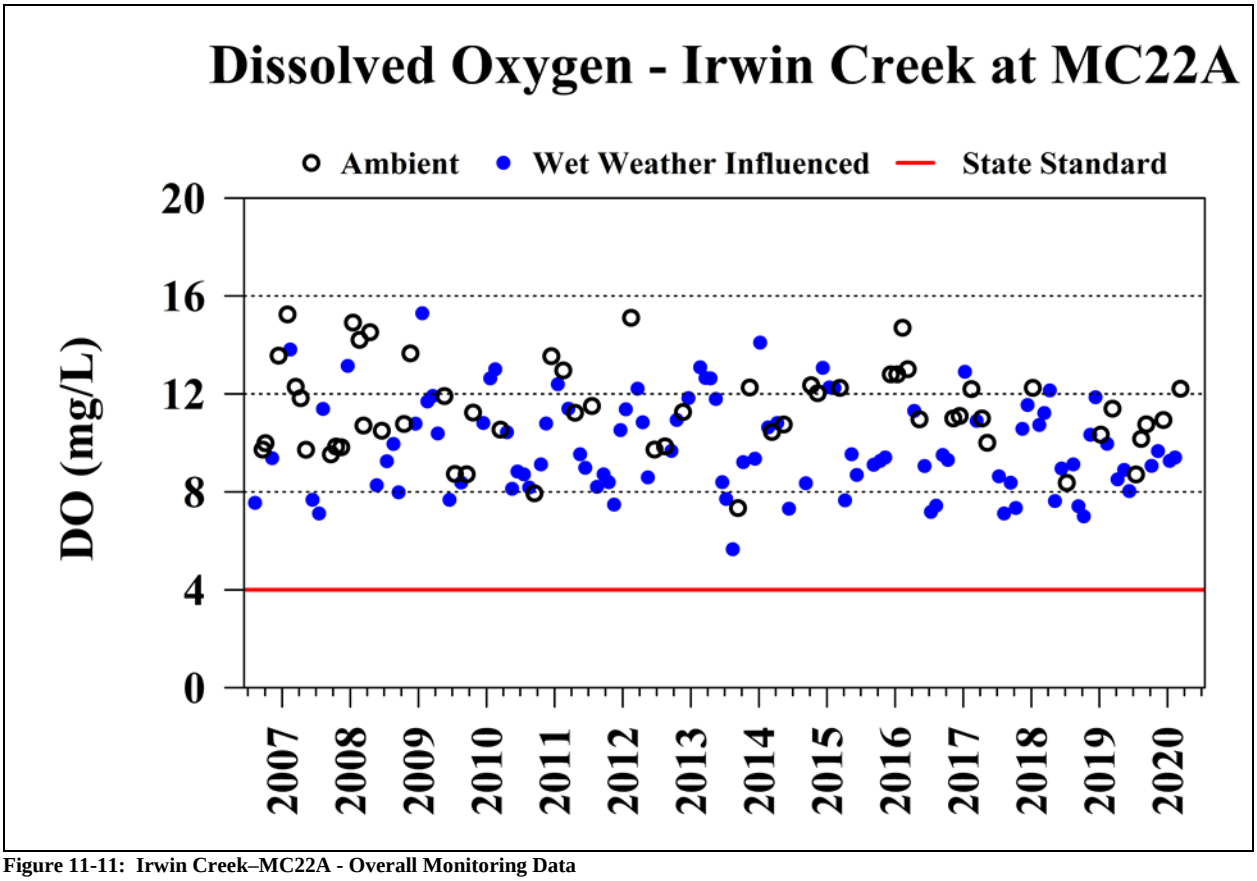


Figure 11-11: Irwin Creek–MC22A - Overall Monitoring Data

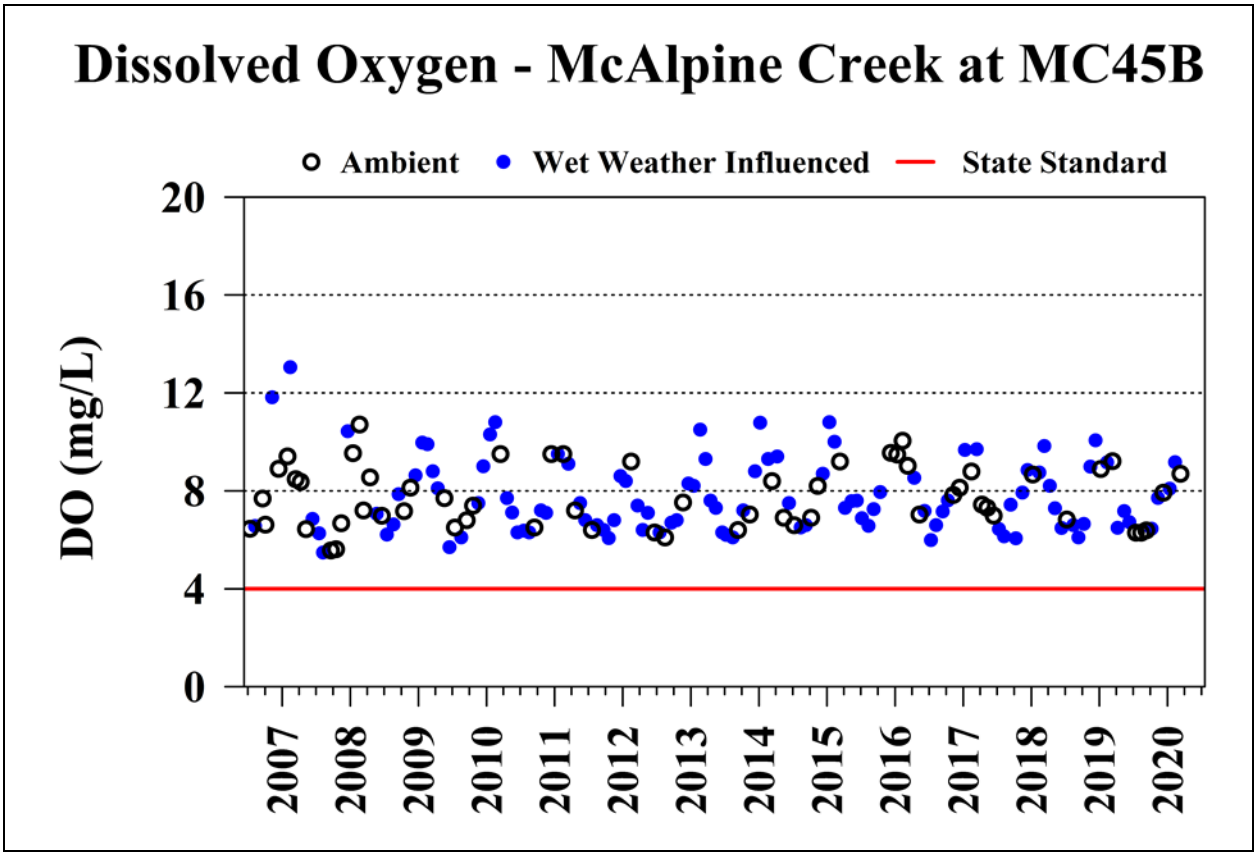


Figure 11-12: McAlpine Creek –MC45B - Overall Monitoring Data

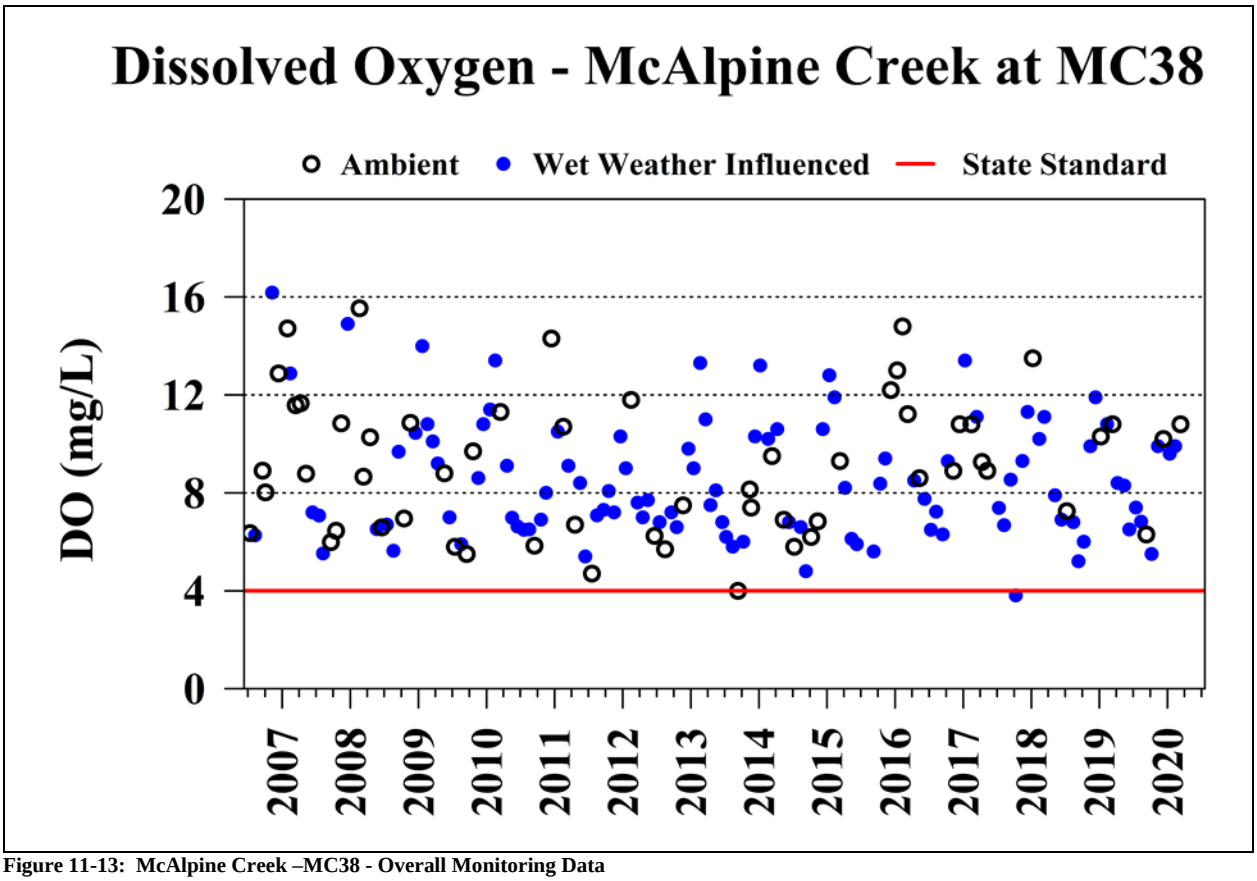


Figure 11-13: McAlpine Creek –MC38 - Overall Monitoring Data

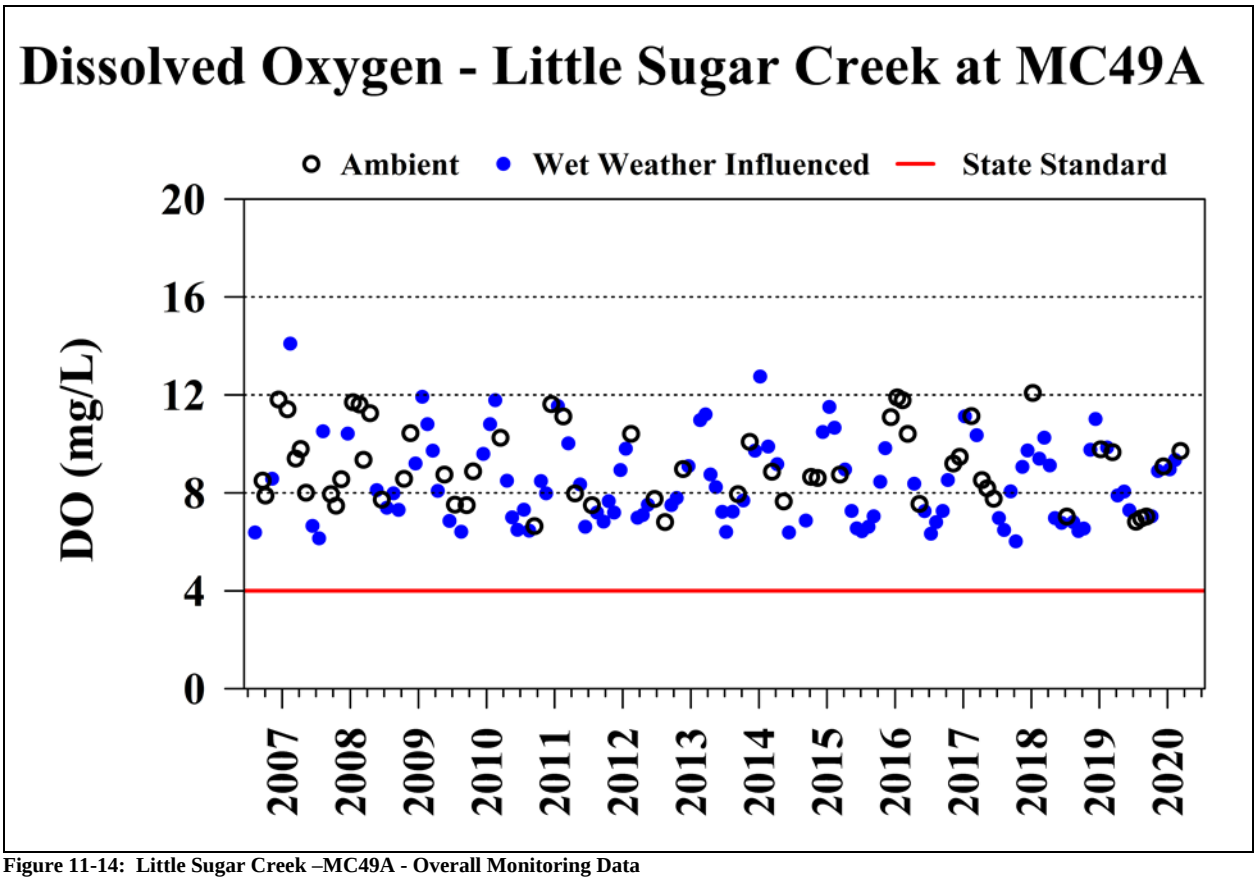


Figure 11-14: Little Sugar Creek –MC49A - Overall Monitoring Data

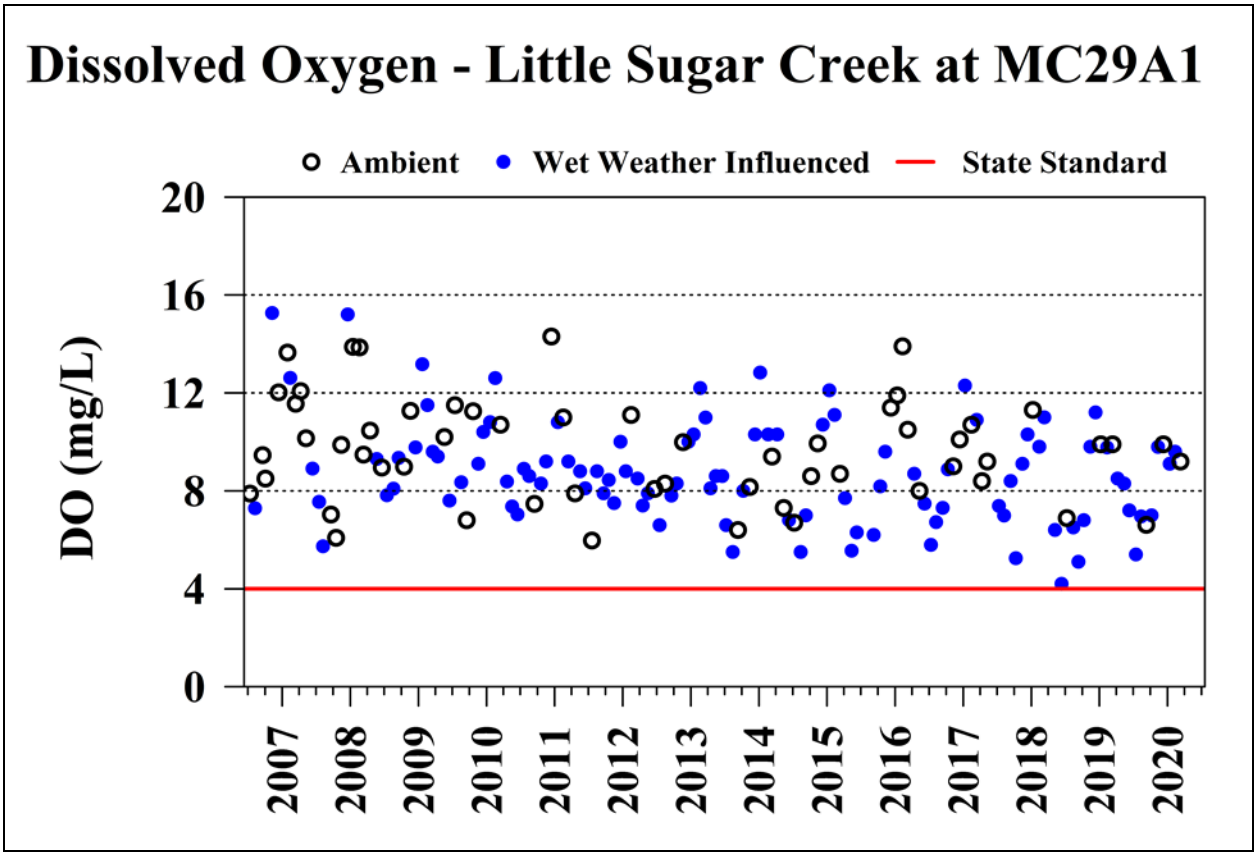


Figure 11-15: Little Sugar Creek –MC29A-1 – Overall Monitoring Data

11.4.4 Chlorophyll a

As stated in sub-section 11.2, Mecklenburg County is responsible for providing annual assessment reports for the Lake Wylie chlorophyll-a TMDL under their NPDES MS4 permit program.

11.4.5 Mercury

NCDEQ did not consider it necessary to include an MS4 NPDES WLA for mercury in their statewide TMDL. For this reason, mercury data is not analyzed under the City's TMDL Watershed Plan.

11.5 Monitoring Plan for Assigned MS4 NPDES Regulated Waste Load Allocation

As part of the TMDL watershed plan the City developed a monitoring plan for each pollutant of concern with an assigned MS4 NPDES regulated WLA within each watershed with an approved TMDL within the City's jurisdiction. The purpose of the monitoring plan is to guide activities for data collection and assessment of pollutants of concern as well as to evaluate the effectiveness of achieving the regulated waste load allocation (WLA) identified within the

TMDL. In developing the monitoring plan, sample locations were selected to assess surface water quality conditions within each TMDL watershed. Additional information concerning the monitoring plan is provided in the City's TMDL Watershed Plan referenced in section 11.2.

11.6 Identification of Additional Measures

As part of the TMDL watershed plan, the City identified additional measures for implementation within the City's MS4 permit program that are designed to achieve the assigned MS4 NPDES regulated WLA and to reduce the TMDL pollutant of concern to the MEP within the watershed to which the TMDL applies. The plan also discusses how the additional measures are designed to reduce the TMDL pollutant of concern. Additional information concerning these measures is provided in the City's TMDL Watershed Plan referenced in section 11.2.

11.7 Implementation of Additional Measures

The TMDL watershed plan was updated to discuss the implementation of the additional programs and measures identified in sub-section 11.6. Additional information concerning these measures is provided in the City's TMDL Watershed Plan referenced in section 11.2 above.

11.8 Tracking Incremental Success

BMP data parameters were identified to track incremental success within the TMDL watershed plan. These parameters and corresponding data for the report period are shown in sub-section 11.10 below.

11.9 Measurable Goals

Table 11-3 describes the various Total Maximum Daily Load (TMDL) Program BMPs and the Measurable Goals for each BMP by permit term year. These BMPs pertain to the City's existing TMDL watershed plan that was developed under the City's previous NPDES MS4 permit.

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Table 11-3: BMP Measurable Goals for Total Maximum Daily Load (TMDL) Program.

BMP	BMP Description	Measurable Goals (by permit term year)				
		1	2	3	4	5+
Identify, describe and map watershed, outfalls, and streams	Within 24 months the permittee shall prepare a plan that: • Identifies the watershed(s) subject to an approved TMDL with an approved Waste Load Allocation (WLAs) assigned to the permittee, • Includes a description of the watershed(s), • Includes a map of watershed(s) showing streams & outfalls • Identifies the locations of currently known major outfalls within its corporate limits with the potential of contributing to the cause(s) of the impairment to the impaired segments, to their tributaries, and to segments and tributaries within the watershed contributing to the impaired segments and • Includes a schedule to discover and locate other major outfalls within its corporate limits that may be contributing to the cause of the impairment to the impaired stream segments, to their tributaries, and to segments and tributaries within the watershed contributing to the impaired segments.	None	Develop TMDL Watershed Plan per requirements of the MS4 permit by Feb 28, 2015.	Update TMDL Watershed Plan as necessary. (On-going, years 3 – 5+)		
Existing measures	Within 24 months the Permittee's plan: • Shall describe existing measures being implemented by the Permittee designed to achieve the MS4's NPDES WLA and to reduce the TMDL pollutant of concern to the MEP within the watershed to which the TMDL applies; and • Provide an explanation as to how those measures are designed to reduce the TMDL pollutant of concern. • The Permittee shall continue to implement the existing measures until notified by DWQ.	None	Identify existing measures within TMDL plan by Feb 28, 2015.	Continue to implement existing measures per TMDL plan. (On-going, years 3 – 5+)		
Assessment of available monitoring data	Within 24 months the permittee's plan shall include an assessment of available monitoring data. Where long-term data is available, this assessment should include an analysis of the data to show trends.	None	Conduct a review and assessment of available monitoring data by Feb 28, 2015.	Continue to review and assess monitoring data as it becomes available. (On-going, years 3 – 5+)		

Monitoring Plan	Within 36 months the permittee shall develop and submit to the Division a Monitoring Plan for the permittee's assigned NPDES regulated WLA as specified in the TMDL. The permittee shall maintain and implement the Monitoring Plan as additional outfalls are identified and as accumulating data may suggest. Following any review and comment by the Division the permittee shall incorporate any necessary changes to monitoring plan and initiate the plan within six months. Modifications to the monitoring plan shall be approved by the Division. Upon request, the requirement to develop a Monitoring Plan may be waived by the Division if the existing and proposed measures are determined to be adequate to achieve the MS4's NPDES WLA to MEP within the watershed to which the TMDL applies.	None	None	Develop monitoring plan for each TMDL watershed for the TMDL pollutants of concern by Feb 28, 2016.	Complete monitoring activities specified in the plan by June 30, 2017. Assess monitoring data collected under the monitoring plan to determine effectiveness of Water Quality Programs by December 31, 2017. Update monitoring plan as necessary based on data review and assessment activities.	Complete monitoring activities specified in the plan by June 30, 2018. Assess monitoring data collected under the monitoring plan to determine effectiveness of Water Quality Programs by December 31, 2018. Update monitoring plan as necessary based on data review and assessment activities.
Additional Measures	Within 36 months the permittee's plan shall: • Describe additional measures to be implemented by the permittee designed to achieve the permittee's MS4's NPDES WLA and to reduce the TMDL pollutant of concern to the MEP within the watershed to which the TMDL applies; and • Provide an explanation as to how those measures are designed to achieve the permittee's MS4's NPDES regulated WLA to the MEP within the watershed to which the TMDL applies.	None	None	Determine additional measures that may be needed to achieve assigned MS4 NPDES regulated WLA and address TMDL pollutant of concern by Feb 28, 2016.	Continue to evaluate and update additional measures per TMDL plan, as needed. (On-going, years 4 – 5^{+})	
Implementation Plan	Within 48 months the permittee's plan shall: • Describe the measures to be implemented within the remainder of the permit term designed to achieve the MS4's NPDES WLA and to reduce the TMDL pollutant of concern to the MEP and • Identify a schedule, subject to DWQ approval, for completing the activities.	None	None	None	Develop an implementation plan for identified additional measures that may be needed to achieve assigned MS4 NPDES regulated WLA and address TMDL	Continue to implement additional measures per the plan.

					pollutant of concern by Feb 28, 2017.	
Incremental Success	The permittee's plan must outline ways to track and report successes designed to achieve the MS4's NPDES regulated WLA and to reduce the TMDL pollutant of concern to MEP within the watershed to which the TMDL applies.	None	None	None	Develop a methodology to track and report data and successes for identified additional measures that may be needed to achieve assigned MS4 NPDES regulated WLA and address TMDL pollutant of concern by June 30, 2017.	Continue to track and report successes per the plan.
Reporting	The permittee shall conduct and submit to the Division an annual assessment of the program designed to achieve the MS4's NPDES WLA and to reduce the TMDL pollutant of concern to the MEP within the watershed to which the TMDL applies. Any monitoring data and information generated from the previous year are to be submitted with each annual report.	None	Prepare an annual assessment of activities and data analysis for the TMDL watershed plan. Provide this information in the NPDES MS4 permit annual report. (On-going, years $2 – 5^{+}$)			

11.10 Program Assessment and Reporting

The overall TMDL Program and Watershed Plan were successfully implemented during the annual report period. **Table 11-4** shows a summary of the various BMPs implemented and corresponding data results per TMDL watershed for the report period. BMPs that apply to the City or a program as a whole, such as television advertisements, cannot be differentiated by watershed and are therefore reported as "Citywide." Additional information concerning these BMPs is provided in the City's TMDL Watershed Plan referenced in sub-section 11.2.

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Table 11-4: TMDL Program Summary for FY2020

TMDL WATERSHED BMP	Citywide	Irwin	Lake Wylie	Little Sugar	Long	McAlpine	McKee	Steele	Sugar
Public Education and Outreach									
Television advertising spots	583								
Radio advertising spots	148								
Social media posts	648								
Social media responses	1,240								
Public requests to stormwater hotline – WQ related	605								
School presentations		8	0[1.]	12	0[1.]	5	0[1.]	4	8
Students educated at school presentations		190	0[1.]	317	0[1.]	102	0[1.]	103	286
Public presentations	29								
Citizens educated at public presentations	672								
Public events	8								
Attendees at public events	1,860								
Website page views	381,610								
Website unique page views	152,566								
Utility bill inserts		110,084	72,840	235,640	74,080	302,114	9,890	38,680	53,982
CMCSI education workshops conducted	2								
Citizens educated at CMCSI workshops	339								
Pet waste messages	16								
Environmental notices and brochures distributed	2								
Flow Free (Fats Oils & Grease-FOG) brochures distributed	2,937								
Flow Free (FOG) presentations	8								
Citizens educated on Flow Free (FOG) program	1,165								

1. Activity not conducted in this watershed during fiscal year 2020.

TMDL WATERSHED BMP	Citywide	Irwin	Lake Wylie	Little Sugar	Long	McAlpine	McKee	Steele	Sugar
Public Involvement									
Storm drains marked		41	12	23	12	68	0[1.]	0[1.]	58
Adopt-A-Stream trash removed (lbs.)		15,040	0[1.]	23,585	330	5,770	0[1.]	0[1.]	3,620
Adopt-A-Stream miles cleaned		15	0[1.]	50	3	26	0[1.]	0[1.]	7
Big Spring Clean trash removed (lbs.)		0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]
Big Spring Clean stream miles cleaned		0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]
Volunteer Monitoring samples collected		1	0[1.]	75	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]
Volunteer Monitoring visual observations		27	0[1.]	92	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]
Trees planted during tree planting volunteer events	428								
Adopt-A-Street bags of trash collected	2,006								
Adopt-A-Street bags of recyclables collected	400								
Adopt-A-Street miles cleaned	455								

1. Activity not conducted in this watershed during fiscal year 2020.

TMDL WATERSHED BMP	Citywide	Irwin	Lake Wylie	Little Sugar	Long	McAlpine	McKee	Steele	Sugar
Illicit Discharge Detection and Elimination (IDDE)									
Stream walk miles inspected		0[1.]	10	19	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]
Stream walk outfalls inspected		0[1.]	20	72	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]
Dry weather flows detected		0[1.]	0[1.]	12	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]
Dry weather flows sampled		0[1.]	0[1.]	1	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]
Stream walk IDDE problems detected/corrected		0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]
Multi-family sewer system inspections		5	0[1.]	10	0[1.]	17	0[1.]	0[1.]	8
Multi-family sewer system personnel trained									
Stormwater pollution ordinance violations/NOVs issued		34	3	45	6	18	0[1.]	3	7
Stormwater pollution ordinance penalty enforcements issued		3	0[1.]	7	0[1.]	1	0[1.]	1	1
Septic system failures detected/corrected		8	0[1.]	4	2	9	2	1	9
Municipal employees trained on IDDE	1,692								
Sanitary sewer use ordinance NOVs issued	46								
Sanitary sewer system pretreatment inspections	150								
Sanitary sewer system FOG inspections	3,154								
Sanitary sewer system pipe miles cleaned	1,058								
Sanitary sewer system ROW miles cleared	101								
Sanitary sewer system lift stations maintained	177								
Sanitary sewer system overflows corrected	151								
Pet waste deposits flagged	40								
Pet waste receptacles provided	100								
IDEP business corridor inspections	1,170								
IDEP outfall inspections		0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]
IDEP problems detected/corrected		2	0[1.]	6	0[1.]	0[1.]	0[1.]	1	0[1.]
IDEP fecal sampled collected		0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]	0[1.]
Citizen service requests responded to		106	7	201	24	125	4	10	43

1. Activity not conducted in this watershed during fiscal year 2020.

TMDL WATERSHED BMP	Citywide	Irwin	Lake Wylie	Little Sugar	Long	McAlpine	McKee	Steele	Sugar
Construction Site Stormwater Runoff Control									
Erosion control ordinance NOVs issued	41								
Erosion control ordinance penalty enforcements issued	31								
Project/site plans reviewed	1,030								
Sites inspected	4,902								
Post-Construction Stormwater Management									
Post-Construction ordinance NOVs and CARs issued	933								
Post-Construction ordinance penalties issued	4								
Post-Construction education workshops conducted	1								
Citizens educated at Post-Construction workshops	74								
Project/site plans reviewed	157								
Buffer protected/added (acres)	99								
Buffer mitigation plans approved		1	1	6	3	4	0[1.]	0[1.]	4
Buffer mitigation information requests addressed		55	100	100	30	100	35	55	80
SCMs added		11	3	14	5	12	0[1.]	9	19
SCMs inspected		345	124	364	241	535	10	283	662
Pollution Prevention/Good Housekeeping									
City facilities inspected		9	0[1.]	9	0[1.]	3	0[1.]	0[1.]	6
Stormwater pollution prevention plans implemented		9	0[1.]	9	0[1.]	3	0[1.]	0[1.]	6
Spill prevention response plans implemented		9	0[1.]	9	0[1.]	3	0[1.]	0[1.]	6
Catch basin tops cleaned	35,766								
Catch basins cleaned	791								
Stormwater lines cleaned (feet)	3,282								
Street sweeping (miles swept)	49,063								
Street sweeping debris/ROW trash removed (tons)[2.]	977								
Yard waste collected (tons)	50,008								

1. Activity not conducted in this watershed during fiscal year 2020.
2. Tonnage includes debris/trash picked up from street sweepers and street ROW debris/trash collected by hand.

TMDL WATERSHED BMP	Citywide	Irwin	Lake Wylie	Little Sugar	Long	McAlpine	McKee	Steele	Sugar
Industrial Facilities									
Industrial facilities inspected		17	0[1.]	7	7	1	0[1.]	0[1.]	10
Vehicle maintenance facilities inspected		14	0[1.]	6	0[1.]	0[1.]	0[1.]	0[1.]	1
Industrial facilities monitored		5	0[1.]	2	0[1.]	0[1.]	0[1.]	1	1
Illicit discharges or connections detected/corrected		1	0[1.]	0[1.]	1	0[1.]	0[1.]	0[1.]	1
Surface Water Quality Monitoring									
Fixed interval TSS samples collected		12	12	49	12	60	12	12	24
Fixed interval Turbidity samples collected		12	12	49	12	60	12	12	24
Fixed interval Dissolved Oxygen samples collected		11	11	44	11	55	11	11	22
Fixed interval Fecal Coliform samples collected		21	12	80	21	95	24	22	39
CMANN Turbidity observations/readings[2.]		4,695	3,600	69,890	5,932	19,927	5,944	5,245	12,236
CMANN Dissolved Oxygen observations/readings [2.]		7,483	4,161	86,201	8,005	24,551	7,896	7,793	14,698
Action/watch level follow-up investigations conducted[3.]		6	0[1.]	25	6	22	9	8	9

1. Activity not conducted in this watershed during fiscal year 2020.
2. CMANN is an automated monitoring network that collects data readings typically once per hour (select sites collect readings every 15 min.). Data reported is QA/QC accepted data only.
3. Includes Fixed Interval and CMANN program investigations.

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